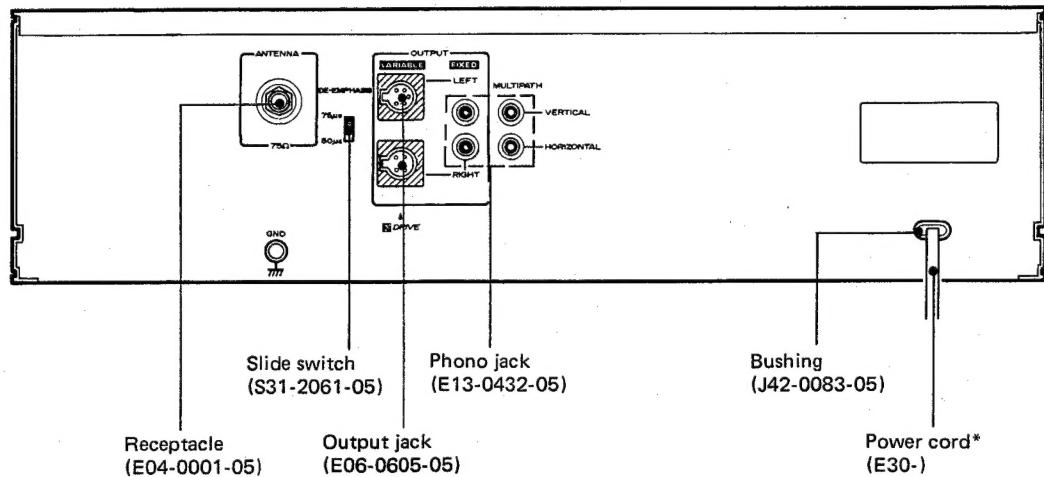
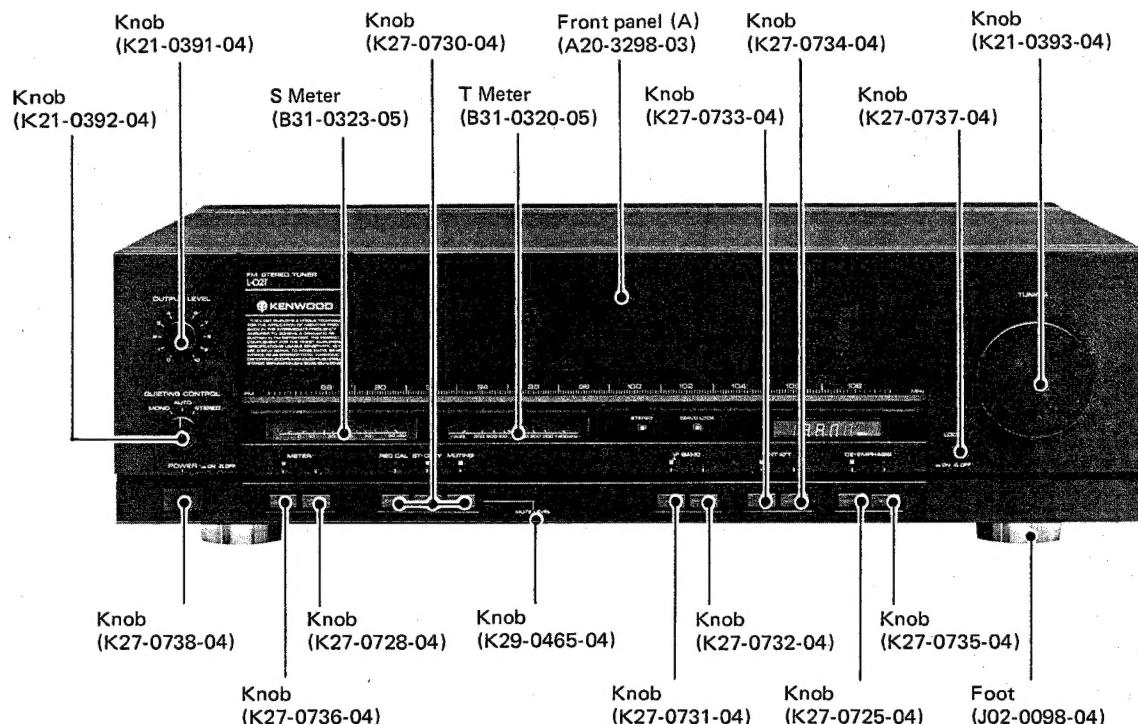




L-02T

FM STEREO TUNER

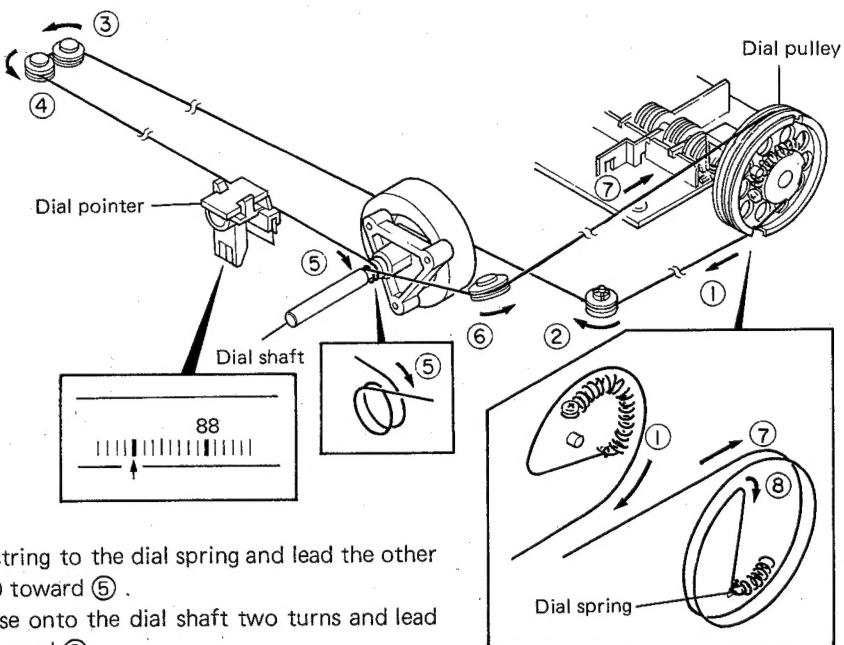


* Refer to Parts List on page 21.

REPAIR MANUAL

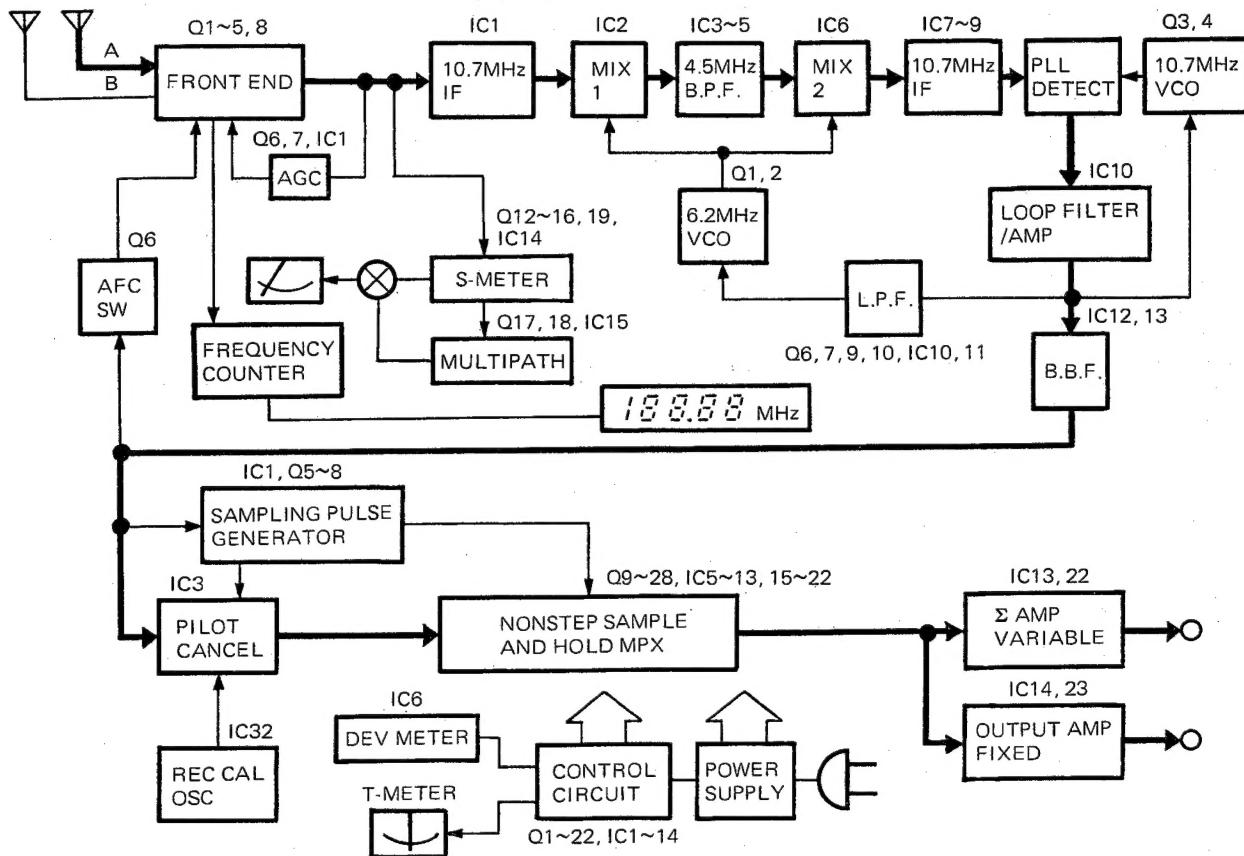
DIAL CORD STRINGING/BLOCK DIAGRAM

DIAL CORD STRINGING



1. Open the variable capacitor.
2. Fasten one end of the dial string to the dial spring and lead the other end in the direction from ① toward ⑤.
3. Wind the dial string clockwise onto the dial shaft two turns and lead it in the direction from ⑥ toward ⑧.
4. Wind the dial string clockwise onto the dial pulley two turns and tie the end of the string to the dial spring.
5. Close the variable capacitor and fix the pointer at the position shown in the diagram, above.

BLOCK DIAGRAM



CIRCUIT DESCRIPTION

Explanation of Circuit Operation-1

1. Front End (X01)

Like the L-01T, the L-02T employs a direct/normal switching gate, a junction FET balanced mixer, and a balance type 2-stage IF amplifier to improve the linearity and mutual modulation. In addition, the L-02T newly employs an AGC circuit to stabilize the IF output level for the new IF system. The AGC circuit limits the IF output to approximately 300mV rms when antenna input is over approximately 100dBf, allowing the IF amplifier to operate in the range where it displays the optimum linearity.

2. IF (X02)

The problem involved in high-fidelity reproduction by the IF unit is the effect of distortion generated from IF-B.P.F. To solve this problem, many of conventional tuners switch the B.P.F. according to the band to ensure high selectivity for narrow bands and high-fidelity reproduction for wide bands. In order to attain reproduction of higher fidelity, however, it is necessary to increase the B.P.F. band, which makes it difficult to obtain the selectivity demanded for as a receiver.

The new IF system (non-spectrum IF) employed in the L-02T compresses the deviation of frequency passing through the B.P.F. to relatively widen the B.P.F. band, enabling exceptional high-fidelity reproduction.

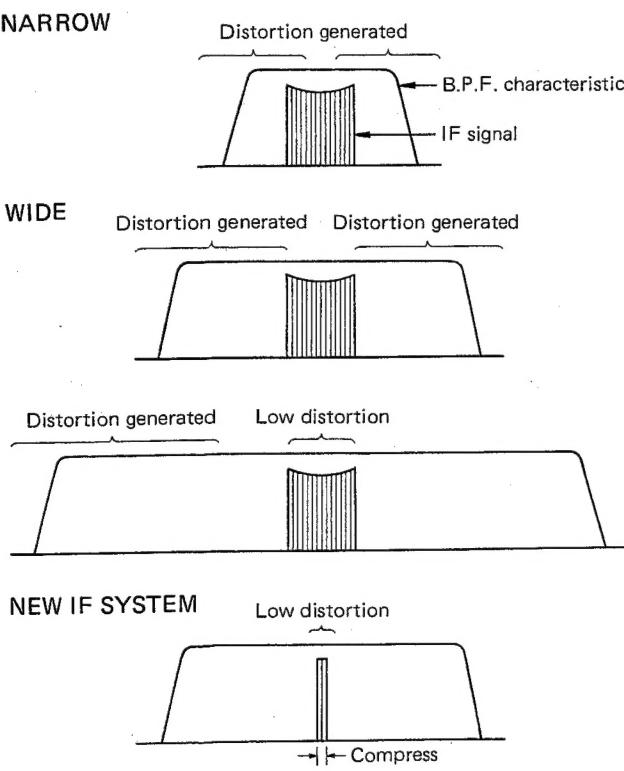
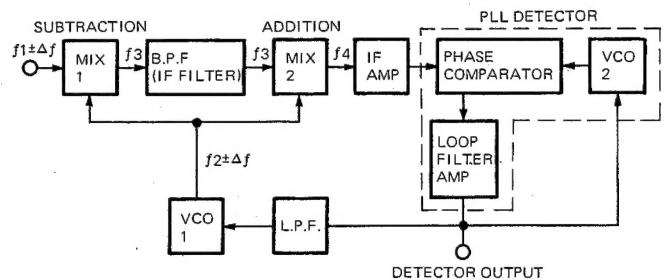


Fig. 1

Figure 2 illustrates how the frequency deviation (side band wave) is compressed. Mixer 1, which is a subtraction heterodyne mixer, puts out to B.P.F. the difference f_3 (4.5MHz) between the input $f_1 \pm \Delta f$ (10.7MHz $\pm \Delta f$) and the VCO 1 input $f_2 \pm \Delta f$ (6.2MHz $\pm \Delta f$) (equation 1). Thus, the deviation Δf disappears, leaving only the B.P.F. center frequency, which enables distortion-free transmission. Since f_3 itself has no Δf component, mixer 2, an addition heterodyne mixer, adds $f_2 \pm \Delta f$ to f_3 to obtain f_4 (equation 2). f_4 represents 10.7MHz $\pm \Delta f$, which is the same as the IF signal from the front end. The signal then passes through the wide-band 10.7MHz IF amplifier and enters the phase comparator of the PLL detector.

The phase comparator detects the phase difference between the IF signal and the VCO 2 output. The output of the phase comparator, after removal of noise outside the band by the loop filter, is negatively fed back to VCO 2, making the VCO 2 frequency coincide with the IF signal frequency. At this time, the VCO 2 control voltage appears as an FM demodulation output. Since the output of the phase comparator tends to become zero, the FM demodulation output cannot be detected at this stage. (Strictly speaking, dynamic error exists.)



$f_1 \pm \Delta f$: 1st intermediate frequency

Δf : Frequency deviation

f_2 : VCO 1 oscillation frequency

f_3 : 2nd intermediate frequency

$$f_3 = (f_1 \pm \Delta f) - (f_2 \pm \Delta f) = f_1 - f_2 \quad \dots \dots \dots (1)$$

$$f_4 = f_3 + (f_2 \pm \Delta f) = f_1 - f_2 + (f_2 \pm \Delta f) = f_1 \pm \Delta f \quad \dots \dots \dots (2)$$

Fig. 2

CIRCUIT DESCRIPTION

The actual circuit of ring modulator type is shown in Figure 3. The VCO output is used to switch the IF signal phase : positive when ① is $+$ and negative when ① is $-$. When ① is $+$, diodes D10 and D9 turn on and ④ becomes equivalent to GND, leaving the wave form appearing at ⑤ invariable. When ① is $-$, diodes D7 and D8 turn on and ③ is connected to GND, inverting the wave form appearing at ⑤. Diodes are provided with a protective resistor.

With the PLL locked, the VCO wave form phase deviates 90° from the input IF signal. In this case, the phase comparator output becomes zero as $+$ and $-$ cancel out each other. When the input IF signal becomes $+\Delta f$, the phase difference decreases, making the phase comparator output positive. This output is turned negative by the inverting amplifier and applied to the VCO vari-cap diode, the VCO frequency following $+\Delta f$. The operation is the same when the input IF signal is $-\Delta f$. This VCO control voltage passes through the 2-stage active base band filter and is put out to the MPX circuit. It is also put out to VCO 1 for second intermediate frequency through L.P.F.

The S-meter and the multipath circuit are the same as for the KT-917.

3. MPX

The major features of the new circuit are as follows :

1. Carrier leak (38kHz, etc.) is extremely reduced, eliminating the need of a low-pass filter which tends to deteriorate the tone quality.
2. Makes the high use of the high separation obtained by the sampling hold method.
3. Uniform demodulation wave form eliminates distortion at the post-stage amplifier.
4. Wide dynamic range improves the S/N ratio.

It is assumed here that the composite signal has been modulated by a triangular wave (1). By the sampling pulse IC switching pulse L (2), the sampling hold circuit completely separates the L-channel component from the composite signal as shown in (3). Then, by the sampling pulse IC switching pulse R (4), the wave form of (3) is sample-held as shown in (5). When this wave form is reheld by the switching pulse L (2), the wave form shown in (6) is obtained. Subtracting (6) from (3) produces the step voltage shown in (7). The wave form of (7) is converted into a slope having a period of 38kHz by an integrator using the switching pulse L for resetting as shown in (8). Finally, (6) and (8) are synthesized to obtain the stepwise wave form shown on (9).

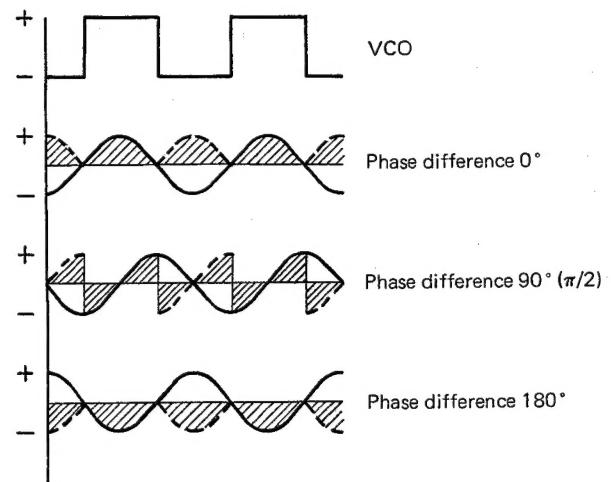
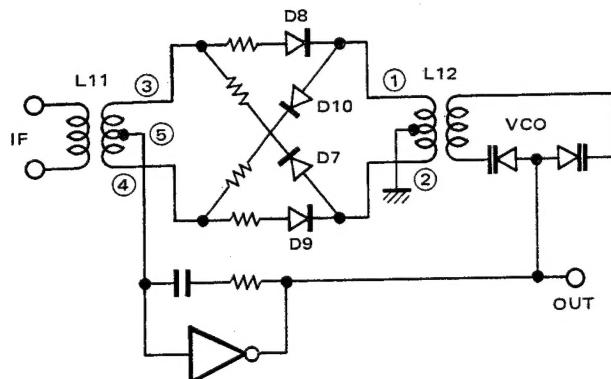
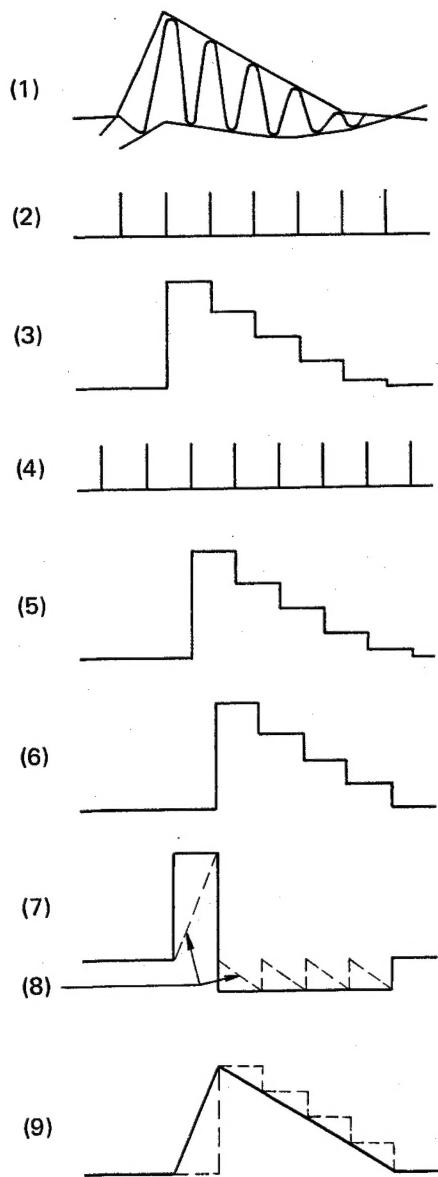


Fig. 3

CIRCUIT DESCRIPTION



Explanation of Circuit Operation-2

This section describes the function of each of the component parts.

• X01 ANT Circuit

RL2,3 : For ANT ATT switching.

• X01 Front End

Q1 : RF amplifier with approximately 20dB gain.

Q2 : Local oscillator tuned buffer. The local oscillator is accommodated in the variable condenser unit.

Q3 : Balanced mixer.

D1,2 : Diode attenuator for AGC.

Q4,5 : IF amplifier with improved linearity.

IC1 : AM detector for AGC. Controls D1,2 via Q7,8 to limit the IF output to 300mVrms or less.

• X02 IF Circuit

L3 : IF -800kHz trap coil.

L4 : IF +800kHz trap coil.

IC1,3~5,7~9 : IF amplifiers.

IC2 : Primary-stage mixer. Converts 10.7MHz into 4.5MHz (2nd IF) and varies the modulation degree.

L32,33 : IF filters for wide bands. Also operate for narrow bands (4.5MHz).

D3~6 : For wide-narrow band switching.

L34,35 : IF filters for narrow bands (4.5MHz).

L7 : 6.2MHz oscillation coil. } Comprise the
Q1,2 : For 6.2MHz oscillation. } VCO.

D2 : Modulates 6.2MHz to make 2nd IF non-side band wave.

IC6 : Second stage mixer. Converts 4.5MHz to 10.7MHz. Modulation degree is the same as with front end output.

D7~10 : Ring modulation type phase comparator of PLL.

L12 : 10.7MHz oscillation coil.

Q3,4,D11: Comprise VCO.

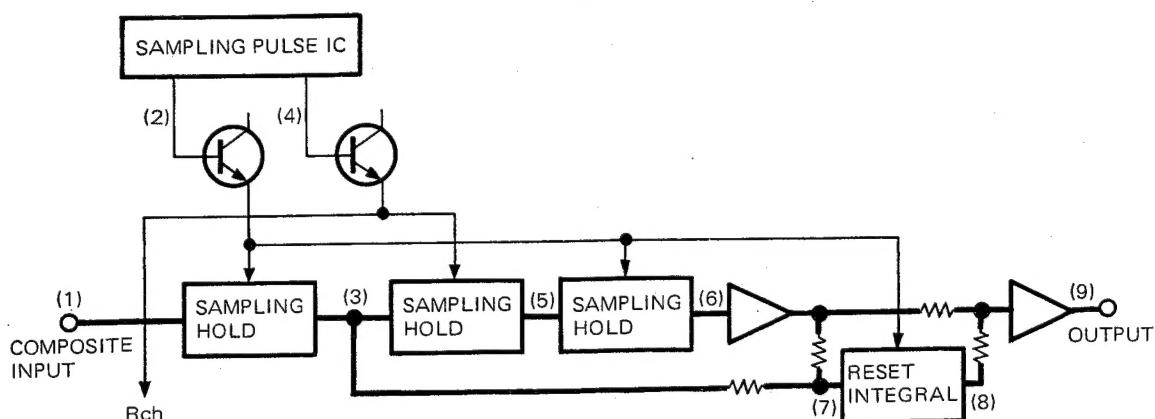


Fig. 4

CIRCUIT DESCRIPTION

Q6,7 : For compensating f-characteristic for narrow band. "ON" for narrow band.

IC10 : Pins 1~3 function as PLL L.P.F. and put out DC component to D11. Pins 5~7 amplify detection output from pin 1.

IC12,13 : Pins 1~3 comprise B.B.F. IC13 puts out signal to T-meter and MPX.

L13 : Noise tuning coil.

Q9 : For compensating f-characteristic. "ON" for narrow band.

IC11 : Pins 5~7 are DC amplifier for 6.2MHz VCO. Pins 1~3 are noise amplifier.

IC12 : Pins 5~7 are noise amplifier. Puts out - voltage from noise component to turn Q10 "OFF".

Q8 : For adjusting noise component. "ON" for narrow band, increasing the gain of noise amplifier IC11.

IC13 : Pins 5~7 put out signal S-M converted by D16, 17 and muting signal from noise amplifier output.

Q5,11 : VCO power supply unit (constant voltage regulator).

Q19,IC14 : IF amplifiers for S-meter.

CF1,2 : Narrow-band ceramic filter facilitating detection of S-meter peak. Adjusts IF system to this center frequency.

Q12~16 : Log amplifiers for S-meter to display in dBf.

Q17,18 : Amplifiers for multipath.

IC15 : Pins 1~3 are S-meter output ; pins 5~7 are multipath output.

D21,22 : Switch S-meter circuit sensitivity by ANT-ATT switching of RF stage.

● X04 MPX

Q1,2 : C-MOS power supply ($\pm 8V$).

Q3,4 : IC1 power supply ($\pm 6V$).

IC2 : Pins 6,8, and 9 cut extremely low band of input signal to prevent shock noise while tuning. Pins 1~5 and 10~13 switch REC CAL.

IC3 : Pins 5~7 are buffer to divide signal into deviation circuit, IC1, and pin 2 of IC3. Pins 1~3 are for pilot cancellation.

IC1 : Sampling hold multi-demodulation IC. This IC alone permits multi-demodulation. Uses four sampling pulse shots, pilot cancel, and stereo lamp circuit (equivalent to KT-1000 multiunit).

IC5 (Pins 1~3),Q9~12 : Composite signal final stage drive amplifier. They are divided into L-ch and R-ch in subsequent stages, using separate power supply units.

IC9 : C-MOS switch for L-ch.

IC27 : C-MOS switch for quieting control. Blends L and R separated by IC9,18.

IC6 (Pins 5~7),Q13~16 : L-ch driver. 1/76 mS delay. Waveform (3) \rightarrow (5). See Figure 4.

IC6 (Pins 1~3),Q17~20 : L-ch driver. 1/76 mS delay. Total delay 1/38 mS. Waveform (5) \rightarrow (6).

IC7 : Pins 5~7 are buffers. Pins 1~3 invert waveform delayed by 1/38 mS, and at the same time, pin 3 makes offset adjustment. This is due to the presence of potential difference of C-MOS switch.

IC8 (Pins 5~7) : Resets and integrates waveform obtained from the added waveform of the waveform (3) and the inverted waveform (6) [(3) - (6)].

IC8 (Pins 1~3) : Synthesizes waveforms (6) and (8), and performs SCA rejection.

IC10 : For separation (wide-narrow) and f-characteristic (stereo-mono) adjustment.

IC11 : Buffer and L.P.F.

IC12 : C-MOS switch for on-off of stereo-mono L.P.F.

IC13 : Buffer and variable output amplifier. Functions as Σ drive.

IC14 : FIXED output amplifier.

IC24,IC5 (Pins 5~7),IC4 : SCA rejection circuit.

Q34 : Muting relay driver.

IC29 : Turns "ON" during muting operation to decrease the gain of IC13.

● X13 Control Circuit

IC11~13 : Accepts input in each mode and displays its status by LED. Perform battery back-up while power is off.

IC7 : Switches signal-multipath and puts out to meter.

IC1 : Detects muting level.

IC5,Q5 : Touch sensor circuits ; Q5 for oscillation, and IC5 for detection.

IC5 (Pins 1~3) : Puts out AFC signal from T-meter signal.

IC2,3 : Puts out muting signal, mono-stereo signal, lock LED signal, and meter muting signal.

IC14 : Puts out IF BAND switching signal.

Q20,21 : Puts out ANT ATT select signal.

Q18,19 : Puts out DE-EMPHASIS select signal.

ADJUSTMENT/REGLAGE/ABGLEICH

TEST INSTRUMENTS

Oscilloscope
FM signal generator
Audio generator . . .
AC voltmeter
FM multiplex genera-
Frequency counter
DC voltmeter
Distortion meter . . .

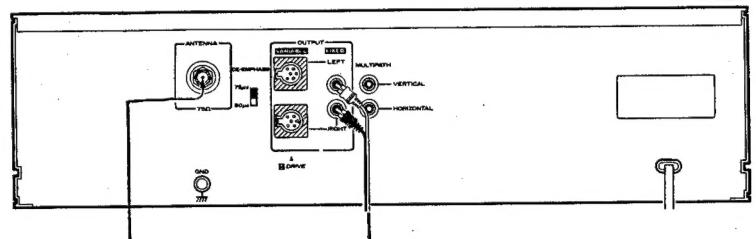
APPAREILLAGE

- .. Oscilloscope
- .. Générateur MF
- .. Générateur audio fréquence
- .. Voltmètre CA
- .. Générateur multiplex stéréo
- .. Compteur de fréquence
- .. Voltmètre CC
- .. Distorsiomètre

PRUFINSTRÜMTE

- . Oszilloskop SCOPE
- . UKW-Signalgenerator FM-SG
- . NF-Signalgenerator AG
- . Wechselspannungsmesser
- . UKW-Multiplexgenerator FM-MPX
- . Frequenzzähler
- . Gleichspannungsmesser
- . Klirrfaktormesser

L-02T



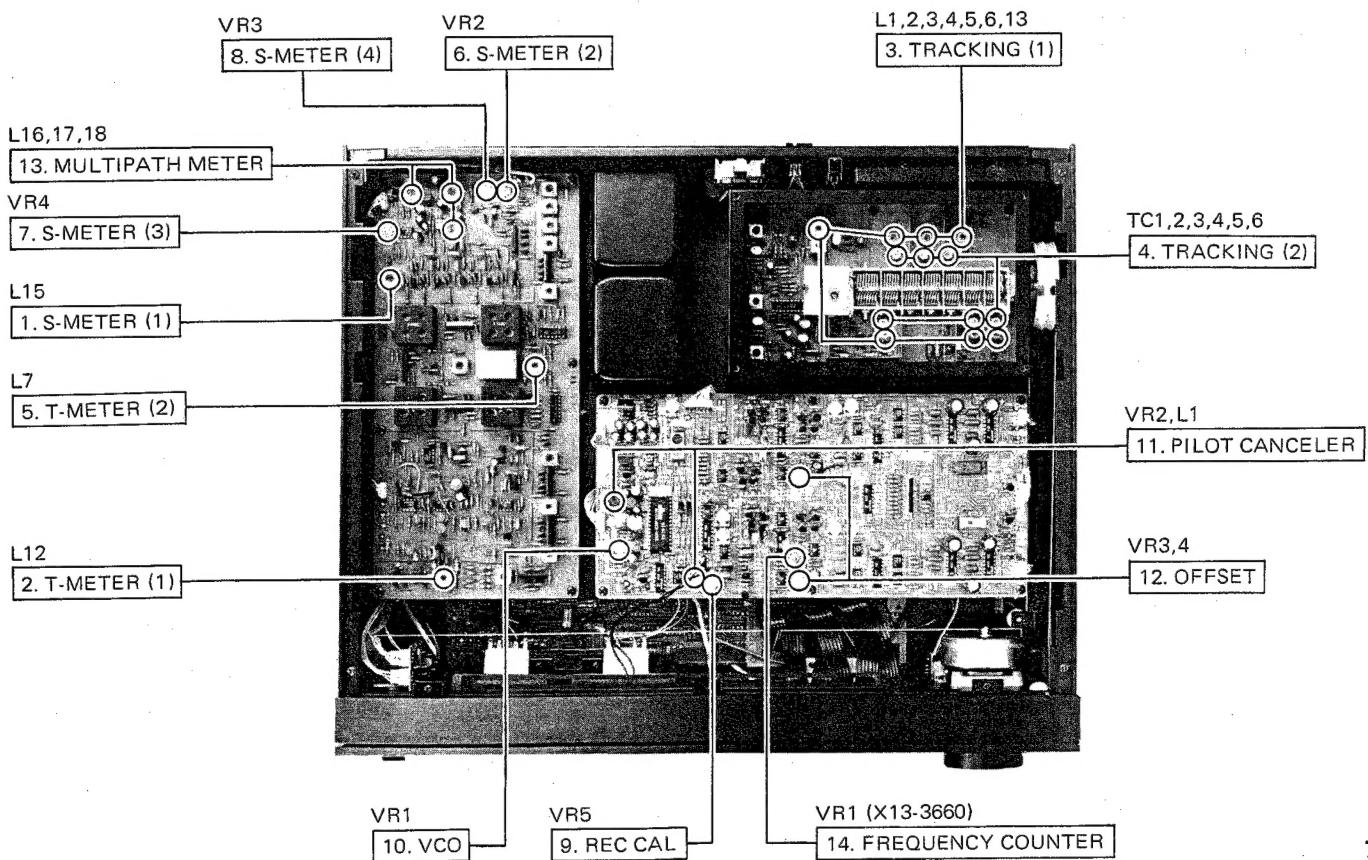
(A) FM-SG — BNC connector — 3C-2V

(C) AG — MPX-SG — FM-SG — 3C-2V

FM-SG — BNC connector

The diagram illustrates four pieces of electronic test equipment:

- AC voltmeter:** A device with a circular dial and a digital display showing '0.000'.
- SCOPE:** An oscilloscope with a CRT screen showing a grid and various control knobs.
- (B) Distortion meter:** A device with a digital display showing '00000' and a control panel with buttons and knobs.
- Frequency counter:** A device with a digital display showing '0000' and a control panel with buttons and knobs.



ADJUSTMENT

Unless otherwise specified, the individual switches should be set as follows : QUIETING : AUTO IF BAND : WIDE REC CAL : OFF LPF : OFF MUTING : OFF METER : SIGNAL ANT ATT : 0dB DE-EMPHASIS : NORMAL LOCK : OFF

NO.	ITEM	INPUT SETTINGS	OUTPUT SETTINGS	TUNER SETTINGS	ALIGNMENT POINTS	ALIGN FOR	FIG.
1	S-METER (1)	(A) 100MHz 0 (Dev) 60dB (ANT input)	S-meter	100MHz	X02-1210 L15	Maximum deflection	
2	T-METER (1)	(A) 100MHz 0 (Dev) 60dB (ANT input)	T-meter	100MHz	X02-1210 L12	Set T-meter pointer in center.	
3	TRACKING (1)	(A) 90MHz 1kHz ± 75kHz (Dev)	S-meter	90MHz	X01-1320 L1,2,3,4, 5,6,13	Maximum deflection	
4	TRACKING (2)	(A) 106MHz 1kHz ± 75kHz (Dev)	S-meter	106MHz	X01-1320 TC1,2,3,4,5,6	Maximum deflection	
Repeat alignments 3 and 4 several times.							
5	T-METER (2)	—	T-meter	100MHz IF BAND: NARROW	X02-1210 L7	Set T-meter pointer in center.	
6	S-METER (2)	(A) 100MHz 0 (Dev) 39dB (ANT input)	S-meter	100MHz	X02-1210 VR2	50dBf	
7	S-METER (3)	(A) 100MHz 0 (Dev) 59dB (ANT input)	S-meter	100MHz	X02-1210 VR4	70dBf	
Repeat alignments 6 and 7 several times.							
8	S-METER (4)	(A) 100MHz 0 (Dev) 59dB (ANT input)	S-meter	100MHz ANT ATT : -20dB	X02-1210 VR3	50dBf	
9	REC CAL	—	(B)	REC CAL : ON	X04-1150 VR5	380mV	
10	VCO	(A) 100MHz 0 (Dev) 80dB (ANT input)	(B)	100MHz Connect 470kΩ resistor between IC1 pins 18 and 2 of X04-1150.	X04-1150 VR1	19.00kHz	
11	PILOT CANCELER	(C) 100MHz Pilot signal 60dB (ANT input)	Connect oscilloscope to intersection of R31 and R32 of X04-1150.	100MHz	X04-1150 VR2 L1	Minimum pilot signal	
12	OFFSET	(C) 100MHz Pilot signal 60dB (ANT input)	Connect oscilloscope to IC10 pin 7 (L) or to IC19 pin 7 (R) of X04-1150.	100MHz	X04-1150 VR3 (L) VR4 (R)	Minimum output	
13	MULTIPATH METER	(C) 100MHz 38kHz (Mod) 10% (AM) 60dB (ANT input)	Multi-path meter	100MHz METER : MULTIPATH	X02-1210 L16,17,18	Maximum deflection	
14	FREQUENCY COUNTER	(A) 100.00MHz 0 (Dev) 20dB (ANT input)	Digital display	MONO 100MHz	X13-3660 VR1	100.0MHz	

ADJUSTMENT

NOTE : Distortion and separation have been factory-adjusted by using precision-class measuring instruments. As far as possible, avoid making the following adjustments, since ordinary measuring instruments are not enough to accurate-

ly measure the distortion, phase, and S/N ratio. For reference purpose, the method of adjustment using FM-SG : MSG-2901 and MPX-SG : MSG-211G is given below.

NO.	ITEM	INPUT SETTINGS	OUTPUT SETTINGS	TUNER SETTINGS	ALIGNMENT POINTS	ALIGN FOR	FIG.
15	DISTORTION (MONO)	(A) 100MHz 1kHz ± 75kHz (Dev) 80dB (ANT input)	(B)	100MHz	X02-1210 L1,2	Minimum distortion	
16	DISTORTION (STEREO WIDE)	(C) 100MHz 1kHz ± 68.25kHz (Dev) Selector : L or SUB 80dB (ANT input)	(B)	100MHz	X02-1210 L32 (colorless core)	Minimum distortion	
17	DISTORTION (STEREO NARROW)	(C) 100MHz 1kHz ± 68.25kHz (Dev) Selector : L or SUB 80dB (ANT input)	(B)	100MHz NARROW	X02-1210 L34 (colorless core)	Minimum distortion	
18	SEPARATION (WIDE)	(C) 100MHz 1kHz ± 68.25kHz (Dev) Selector : L or R 60dB (ANT input)	(B)	100MHz	X04-1150 VR8 (L) VR10 (R)	Minimum cross talk	
19	SEPARATION (NARROW)	(C) 100MHz 1kHz ± 68.25kHz (Dev) Selector : L or R 60dB (ANT input)	(B)	100MHz NARROW	X04-1150 VR9 (L) VR11 (R)	Minimum cross talk	
20	SCA (1)	(C) 100MHz 73kHz ± 6.7kHz (Dev) 60dB (ANT input)	(B)	100MHz	X04-1150 VR6 (L) VR7 (R)	Minimum output	
21	SCA (2)	(C) 100MHz 65kHz ± 6.5kHz (Dev) 60dB (ANT input)	(B)	100MHz	X04-1150 L2	Minimum output	

REGLAGE

Sauf en cas d'indications spéciales, régler chaque commutateur comme suit : QUIETING : AUTO IF BAND : WIDE REC CAL : OFF LPF : OFF MUTING : OFF METER : SIGNAL ANT ATT : 0dB DE-EMPHASIS : NORMAL LOCK : OFF

Nº	ITEM	REGLAGE DE L'ENTREE	REGLAGE DE LA SORTIE	REGLAGE DU TUNER	POINTS DE L'ALIGNEMENT	ALIGNER POUR	FIG.
1	COMPTEUR S (1)	(A) 100MHz 0 (Dév) 60dB (Entrée ANT)	Compteur S	100MHz	X02-1210 L15	Déviation maximale	
2	COMPTEUR T (1)	(A) 100MHz 0 (Dév) 60dB (Entrée ANT)	Compteur T	100MHz	X02-1210 L12	Amener l'aiguille du compteur T au point centre.	
3	SYNTONISATION (1)	(A) 90MHz 1kHz ± 75kHz (Dév)	Compteur S	90MHz	X01-1320 L1,2,3,4,5,6,13	Déviation maximale	
4	SYNTONISATION (2)	(A) 106MHz 1kHz ± 75kHz (Dév)	Compteur S	106MHz	X01-1320 TC1,2,3,4,5,6	Déviation maximale	
Répéter les points 3 et 4 plusieurs fois.							
5	COMPTEUR T (2)	—	Compteur T	100MHz IF BAND:NARROW	X02-1210 L7	Amener l'aiguille du compteur T au point centre.	
6	COMPTEUR S (2)	(A) 100MHz 0 (Dév) 39dB (Entrée ANT)	Compteur S	100MHz	X02-1210 VR2	50dBf	
7	COMPTEUR S (3)	(A) 100MHz 0 (Dév) 59dB (Entrée ANT)	Compteur S	100MHz	X02-1210 VR4	70dBf	
Répéter les points 6 et 7 plusieurs fois.							
8	COMPTEUR S (4)	(A) 100MHz 0 (Dév) 59dB (Entrée ANT)	Compteur S	100MHz DIRECT	X02-1210 VR3	50dBf	
9	REC CAL	—	(B)	REC CAL : ON	X04-1150 VR5	380mV	
10	OSCILLATEUR CONTROLE PAR LA TENSION	(A) 100MHz 0 (Dév) 80dB (Entrée ANT)	(B)	100MHz Connecter une résistance de 470kΩ entre les fiche 18 et 2 de IC1, X04-1150.	X04-1150 VR1	19,00kHz	
11	ANNULATEUR DE SIGNAL PILOTE	(C) 100MHz Signal pilote 60dB (Entrée ANT)	Connecter un oscilloscope au point d'intersection entre R31 et R32 de X04-1150.	100MHz	X04-1150 VR2 L1	Sortie de signal pilote minimale.	
12	ECART DE REGLAGE	(C) 100MHz Signal pilote 60dB (Entrée ANT)	Connecter un oscilloscope (G) à la fiche 7 de IC10, ou à la fiche 7 de IC19, de X04-1150.	100MHz	X04-1150 VR3 (G) VR4 (D)	Sortie minimale.	
13	COMPTEUR DE MULTIVOIES	(C) 100MHz 38kHz (Mod) 10% (AM) 60dB (Entrée ANT)	Compteur de multivoies	100MHz	X02-1210 L16,17,18	Déviation maximale	
14	CADRAN NUMERIQUE DES FREQUENCES	(A) 100,00MHz 0 (Dév) 20dB (Entrée ANT)	Cadran numérique	MONO 100MHz	X13-3660 VR1	100,0MHz	

REGLAGE

NOTE : Le réglage de la distorsion et de l'effet stéréophonique est effectué avec un appareil de mesure à haute précision. Les appareils de mesure ordinaires, étant donnés qu'ils manquent de précision dans la mesure de la phase, de la distorsion et du rapport signal sur bruit, ne permettraient

pas un réglage correct. De ce fait, il est déconseillé d'effectuer les réglages mentionnés ci-dessous.

A titre d'information, les réglages ayant recours à FM-SG : MSG-2901, MPX-SG : MSG-211G sont expliqués comme suit.

N°	ITEM	REGLAGE DE L'ENTREE	REGLAGE DE LA SORTIE	REGLAGE DU TUNER	POINTS DE L'ALIGNEMENT	ALIGNER POUR	FIG.
15	DISTORSION (MONO)	(A) 100MHz 1kHz ± 75kHz (Dév) 80dB (Entrée ANT)	(B)	100MHz	X02-1210 L1,2	Distorsion minimale	
16	DISTORSION (STEREO WIDE)	(C) 100MHz 1kHz ± 68,25kHz (Dév) Sélecteur : L ou SUB 80dB (Entrée ANT)	(B)	100MHz	X02-1210 L32 (Noyau sans couleur)	Distorsion minimale.	
17	DISTORSION (STEREO NARROW)	(C) 100MHz 1kHz ± 68,25kHz (Dév) Sélecteur : L ou SUB 80dB (Entrée ANT)	(B)	100MHz NARROW	X02-1210 L34 (Noyau sans couleur)	Distorsion minimale.	
18	SEPARATION (WIDE)	(C) 100MHz 1kHz ± 68,25kHz (Dév) Sélecteur : L ou R 60dB (Entrée ANT)	(B)	100MHz	X04-1150 VR8 (G) VR10 (D)	Diaphonie minimale.	
19	SEPARATION (NARROW)	(C) 100MHz 1kHz ± 68,25kHz (Dév) Sélecteur : L ou R 60dB (Entrée ANT)	(B)	100MHz NARROW	X04-1150 VR9 (G) VR11 (D)	Diaphonie minimale.	
20	SCA (1)	(C) 100MHz 73kHz ± 6,7kHz (Dév) 60dB (Entrée ANT)	(B)	100MHz	X04-1150 VR6 (G) VR7 (D)	Sortie minimale.	
21	SCA (2)	(C) 100MHz 65kHz ± 6,5kHz (Dév) 60dB (Entrée ANT)	(B)	100MHz	X04-1150 L2	Sortie minimale.	

ABGLEICH

Außer wenn anders angegeben, die verschiedenen Schalter wie folgt einstellen : QUIETING : AUTO IF BAND : WIDE REC CAL : OFF LPF : OFF MUTING : OFF METER : SIGNAL ANT ATT : 0dB DE-EMPHASIS : NORMAL LOCK : OFF

NR.	GEGENSTAND	EIGANGS-EINSTELLUNG	AUSGANGS-EINSTELLUNG	TUNER-EINSTELLUNG	ABGLEICH-PUNKTE	ABGLEICHEN FÜR	ABB.
1	S-METER (1)	(A) 100MHz 0 (Hub) 60dB (ANT-Eingang)	S-Meter	100MHz	X02-1210 L15	Maximaler Ausschlag	
2	T-METER (1)	(A) 100MHz 0 (Hub) 60dB (ANT-Eingang)	T-Meter	100MHz	X02-1210 L12	Den Zeiger des T-Meters auf die Mitte einstellen.	
3	KRIECHWEG-BILDUNG (1)	(A) 90MHz 1kHz ± 75kHz (Hub)	S-Meter	90MHz	X01-1320 L1,2,3,4, 5,6,13	Maximaler Ausschlag	
4	KRIECHWEG-BILDUNG (2)	(A) 106MHz 1kHz ± 75kHz (Hub)	S-Meter	106MHz	X01-1320 TC1,2,3,4,5,6	Maximaler Ausschlag	
Abstimmungen 3 und 4 mehrere Male wiederholem.							
5	T-METER (2)	—	T-Meter	100MHz IF BAND:NARROW	X02-1210 L7	Den Zeiger des T-Meters auf die Mitte einstellen.	
6	S-METER (2)	(A) 100MHz 0 (Hub) 39dB (ANT-Eingang)	S-Meter	100MHz	X02-1210 VR2	50dBf	
7	S-METER (3)	(A) 100MHz 0 (Hub) 59dB (ANT-Eingang)	S-Meter	100MHz	X02-1210 VR4	70dBf	
Abstimmungen 6 und 7 mehrere Male wiederholem.							
8	S-METER (4)	(A) 100MHz 0 (Hub) 59dB (ANT-Eingang)	S-Meter	100MHz DIRECT	X02-1210 VR3	50dBf	
9	REC CAL	—	DEV-Meter	REC CAL : ON	X04-1150 VR5	380mV	
10	SPANNUNGS-GEREGELTER OSZILLATOR	(A) 100MHz 0 (Hub) 80dB (ANT-Eingang)	(B)	100MHz Einen 470kΩ Widerstand zwischen den Stiften 18 und 2 von X04-1150 IC1 anschließen.	X04-1150 VR1	19,00kHz	
11	PILOTON-ANNULIERER	(C) 100MHz Pilotton 60dB (ANT-Eingang)	Oszilloskop an den Schnittpunkt von X04-1150 R31 und R32 anschließen.	100MHz	X04-1150 VR2 L1	Minimaler Pilotton-ausgang	
12	VERSTZUNG	(C) 100MHz Pilotton 60dB (ANT-Eingang)	Oszilloskop zum Stift 7 von IC10 oder zum Stift 7 von IC19 von X04-1150 anschließen.	100MHz	X04-1150 VR3 (L) VR4 (R)	Minimaler Ausgang	
13	MEHRDURCH-LAUF-METER	(C) 100MHz 38kHz (Mod) 10% (AM) 60dB (ANT-Eingang)	Mehr durchlauf-Meter	100MHz	X02-1210 L16,17,18	Maximaler Ausschlag	
14	DIGITAL FREQUENZAN-ZEIGE	(A) 100,00MHz 0 (Hub) 20dB (ANT-Eingang)	Digital-anzeige	MONO 100MHz	X13-3660 VR1	100,0MHz	

ABGLEICH

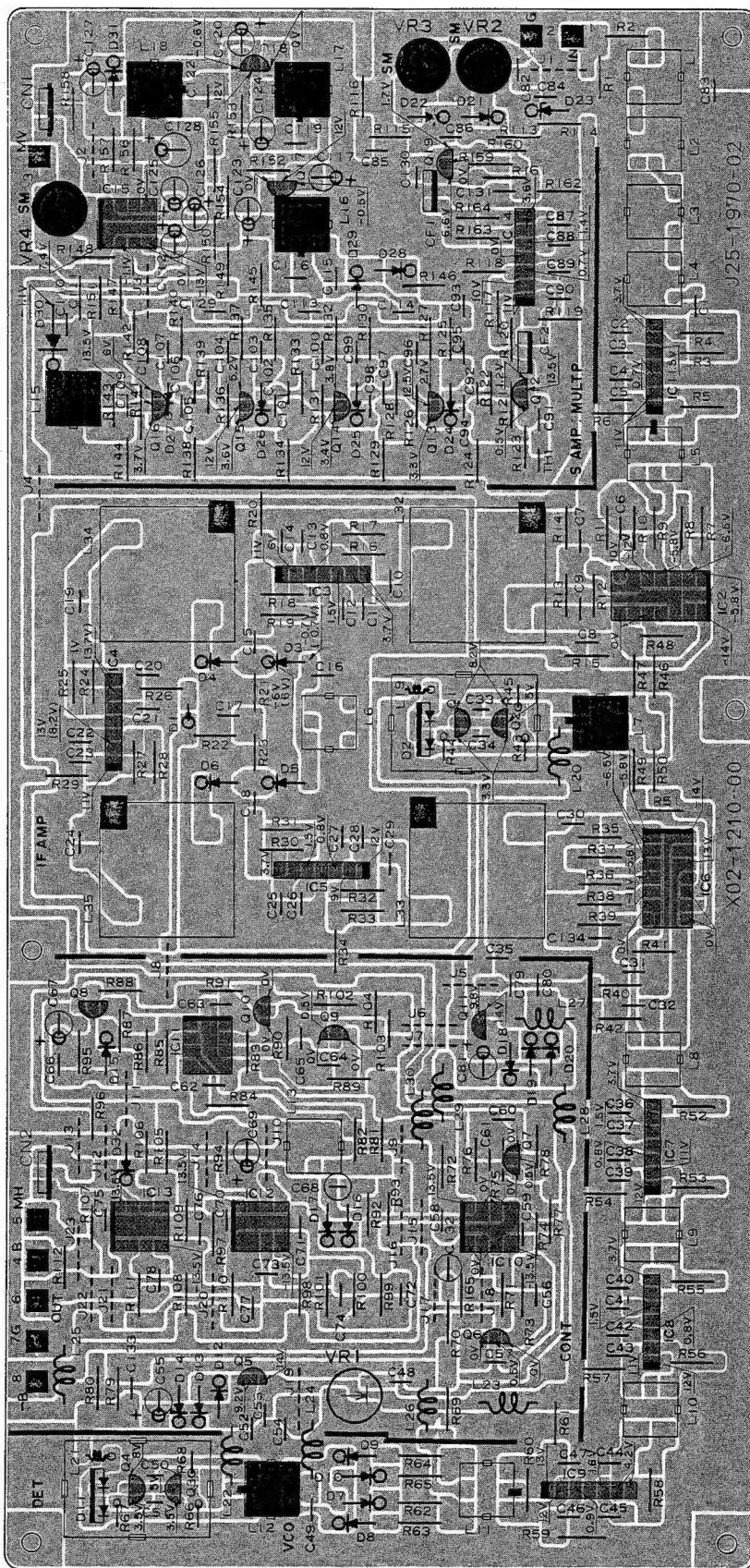
ANMERKUNG : Die Verzerrung und die Trennung sind in der Fabrik mit Hilfe von Präzisionsinstrumenten eingestellt. Wenn möglich sollten die folgenden Einstellungen vermieden werden, da gewöhnliche Meßinstrumente nicht präzis

genug sind, um die Verzerrung, die Phase und den Rauschabstand genau zu messen. Als Referenz ist hier die Abgleichsmethode mit Hilfe von FM-SG : MSG-2901 und MPX-SG : MSG-211G angegeben.

NR.	GEGENSTAND	EINGANGS-EINSTELLUNG	AUSGANGS-EINSTELLUNG	TUNER-EINSTELLUNG	ABGLEICH-PUNKTE	ABGLEICHEN FÜR	ABB.
15	VERZERRUNG (MONO)	(A) 100MHz 1kHz ± 75kHz (Hub) 80dB (ANT-Eingang)	(B)	100MHz	X02-1210 L1,2	Minimaler Klirrfaktor.	
16	VERZERRUNG (STEREO WIDE)	(C) 100MHz 1kHz ± 68,25kHz (Hub) Wahlschalter : L oder SUB 80dB (ANT-Eingang)	(B)	100MHz	X02-1210 L32 (farbloser Kern)	Minimaler Klirrfaktor.	
17	VERZERRUNG (STEREO NARROW)	(C) 100MHz 1kHz ± 68,25kHz (Hub) Wahlschalter : L oder SUB 80dB (ANT-Eingang)	(B)	100MHz NARROW	X02-1210 L34 (farbloser Kern)	Minimaler Klirrfaktor.	
18	KANALTREN-NUNG (WIDE)	(C) 100MHz 1kHz ± 68,25kHz (Hub) Wahlschalter : L oder R 60dB (ANT-Eingang)	(B)	100MHz	X04-1150 VR8 (L) VR10 (R)	Minimales Übersprechen.	
19	KANALTREN-NUNG (NARROW)	(C) 100MHz 1kHz ± 68,25kHz (Hub) Wahlschalter : L oder R 60dB (ANT-Eingang)	(B)	100MHz NARROW	X04-1150 VR9 (L) VR11 (R)	Minimales Übersprechen.	
20	SCA (1)	(C) 100MHz 73kHz ± 6,7kHz (Hub) 60dB (ANT-Eingang)	(B)	100MHz	X04-1150 VR6 (L) VR7 (R)	Minimaler Ausgang.	
21	SCA (2)	(C) 100MHz 65kHz ± 6,5kHz (Hub) 60dB (ANT-Eingang)	(B)	100MHz	X04-1150 L2	Minimaler Ausgang.	

PC BOARD

FM IF (X02-1210-11) Component side view



Refer to the schematic diagram for the values of resistors and capacitors.
 The PC board drawing is viewed from the side easy to check.

Input condition

① ~ ⑨, ⑬, ⑭: 85MHz, 0 (Dev),
80dB (ANT input)
⑩ ~ ⑫: 85MHz, 1kHz (Mod),
75kHz (Dev), 80dB (ANT input)

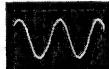
① IF output
0.05μS/DIV, 0.5V/DIV



② 0.05μS/DIV, 0.5V/DIV
IF waveform



③ 2nd IF (4.5MHz) WIDE
0.05μS/DIV, 0.5V/DIV



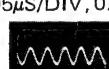
④ 2nd IF (4.5MHz) NARROW
0.05μS/DIV, 0.5V/DIV



⑤ 6.2MHz VCO output
0.05μS/DIV, 0.5V/DIV



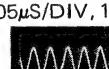
⑥ IF waveform
0.05μS/DIV, 0.5V/DIV



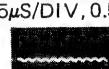
⑦ IF output
0.05μS/DIV, 1V/DIV



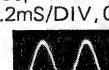
⑧ 10.7MHz VCO output
0.05μS/DIV, 1V/DIV



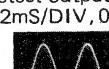
⑨ Phase comparator output
0.05μS/DIV, 0.5V/DIV



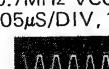
⑩ ⑪ Loop filter output
0.2mS/DIV, 0.5V/DIV



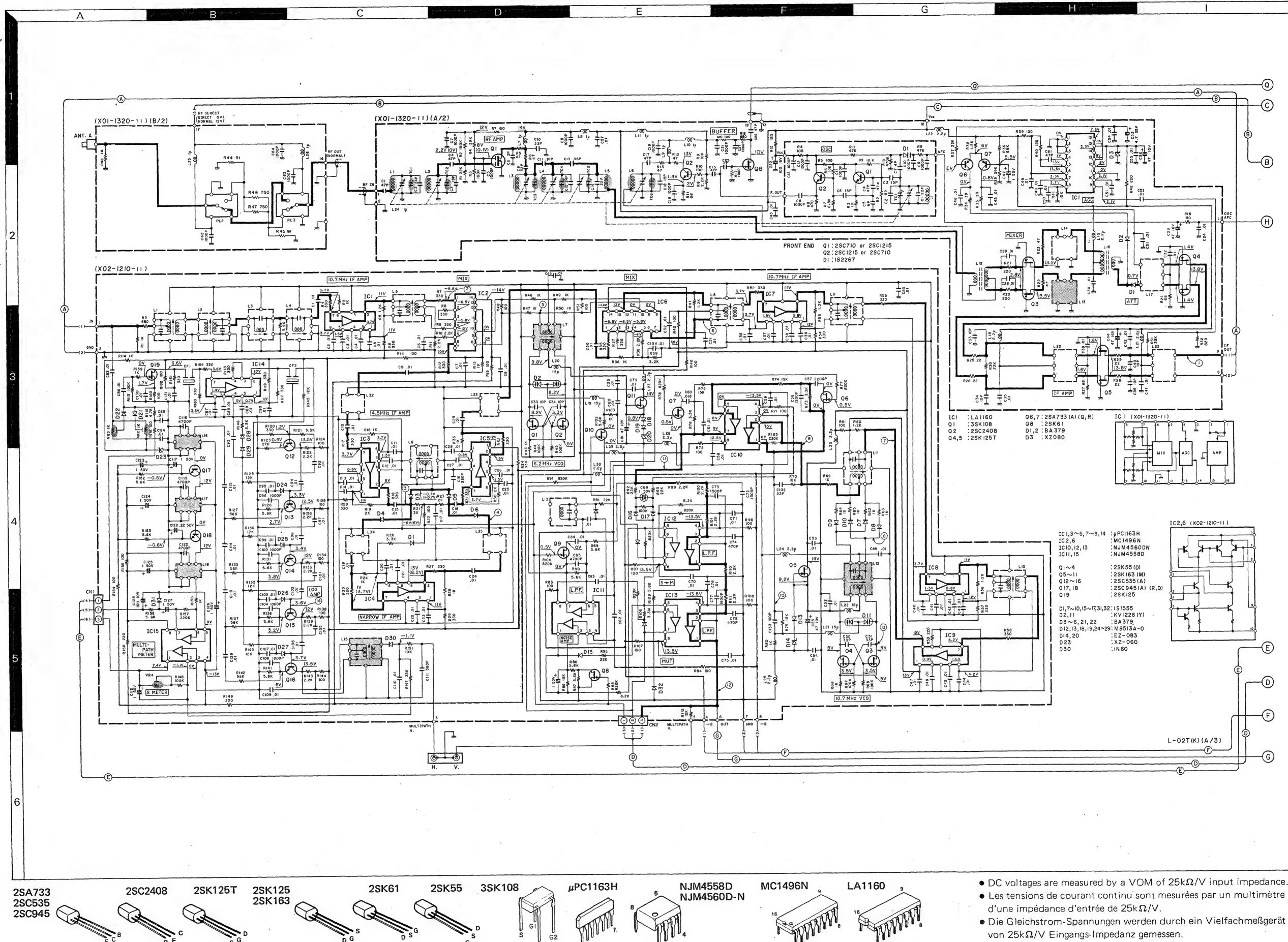
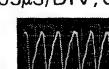
⑫ Detect output
0.2mS/DIV, 0.5V/DIV



⑬ 10.7MHz VCO
0.05μS/DIV, 1V/DIV



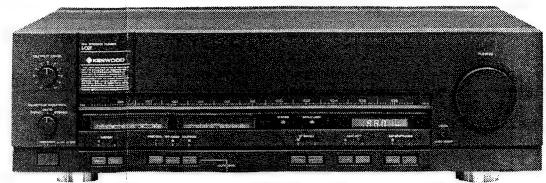
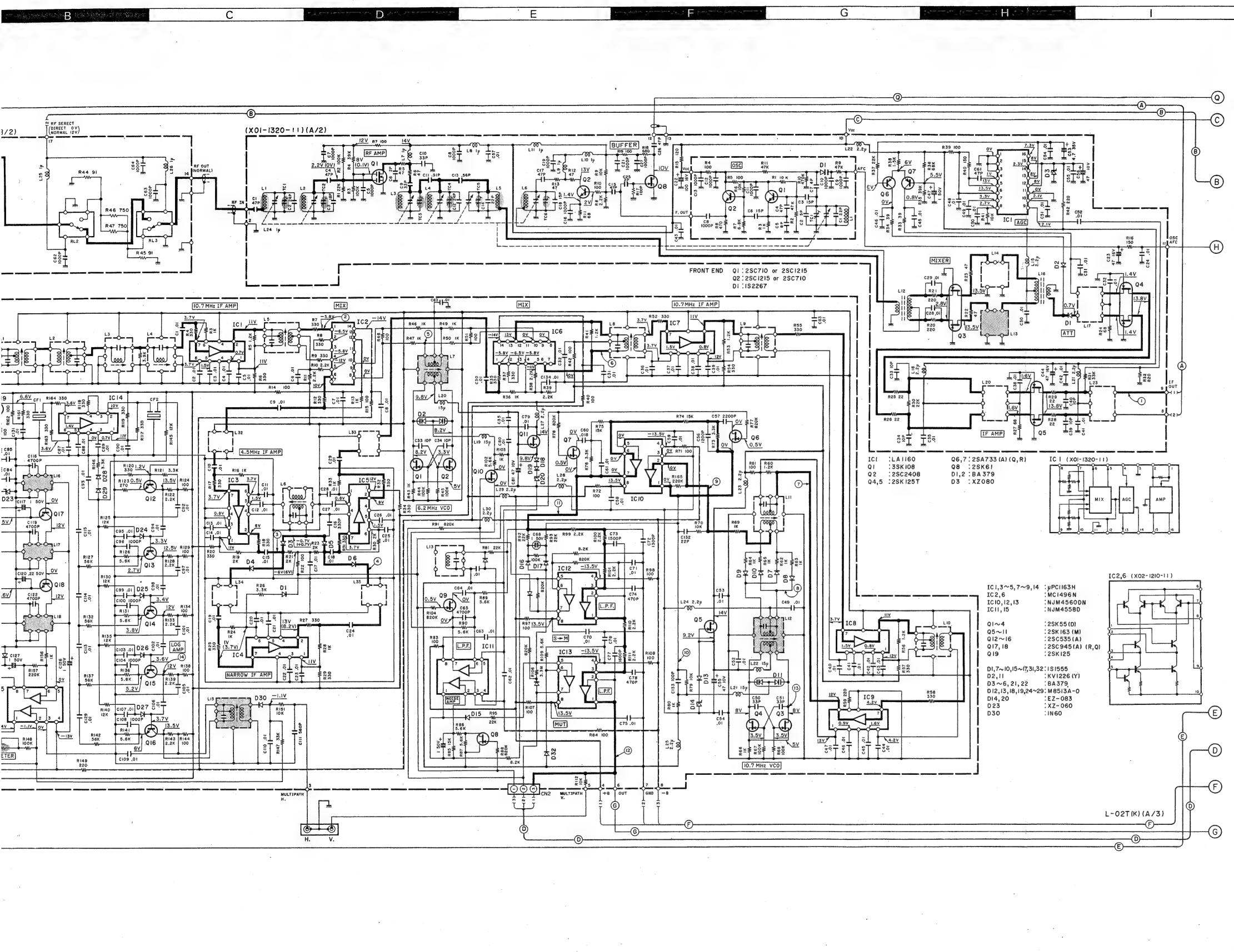
⑭ Log amp
0.05μS/DIV, 0.5V/DIV



- DC voltages are measured by a VOM of 25kΩ/V input impedance.
- Les tensions de courant continu sont mesurées par un multimètre d'une impédance d'entrée de 25kΩ/V.
- Die Gleichstrom-Spannungen werden durch ein Vielfachmeßgerät von 25kΩ/V Eingangs-Impedanz gemessen.

FM STEREO TUNER

L-02T



SPECIFICATIONS

PERFORMANCE

Usable Sensitivity	10.7 dBf (0.95 μ V)
50dB Quieting Sensitivity (Mono)	16.3 dBf (1.8 μ V)
(Stereo)	39.2 dBf (25 μ V)
Signal to Noise Ratio (Mono)	95 dB
(Stereo)	85 dB
Total Harmonic Distortion (85 dBf)	0.005% (WIDE) 0.006% (NARROW)
100 Hz	0.01% (WIDE) 0.02% (NARROW)
6,000 Hz	0.02% (WIDE) 0.02% (NARROW)
15,000 Hz	0.02% (WIDE) 0.02% (NARROW)
50 Hz ~ 10,000 Hz	0.02% (WIDE) 0.02% (NARROW)
(Stereo)	0.02% (WIDE) 0.02% (NARROW)
1,000 Hz	0.01% (WIDE) 0.1% (NARROW)
6,000 Hz	0.03% (WIDE) 0.3% (NARROW)
15,000 Hz	0.04% (WIDE) 0.2% (NARROW)

Capture Ratio 1.0 dB 3.8 dB

Alternate Channel Selectivity 45 dB (± 400 kHz) 65 dB (± 300 kHz)

Stereo Separation 55 dB 45 dB
50 Hz ~ 10,000 Hz 45 dB 35 dB
15,000 Hz 40 dB

Frequency Response 15 Hz to 15,000 Hz +0.2 dB -0.5 dB

Sporious Response Ratio 120 dB 120 dB

Image Response Ratio 120 dB 120 dB

IF Response Ratio 120 dB 120 dB

AM Suppression Ratio 70 dB 70 dB

Sub Carrier Product Ratio 70 dB 70 dB

Antenna Impedance 75 ohms unbalanced

Output Level at 1 kHz 100% Mod. 0.75V, less than 1 ohm

Fixed 1.5V, less than 1 ohm (Sigma drive)

Variable 0.5V, 3k ohms

Vertical 0.01V, 10k ohms

Horizontal ± 2 mm

GENERAL

Power Requirement 60 Hz, 120V (U.S.A. and Canada models)

Model sold elsewhere incorporates switches to accommodate 50/60 Hz, 120/220-240V
37 watts

Dimensions W: 480 mm (18-7/8")
H: 147.5 mm (5-13/16")
D: 423 mm (16-5/8")

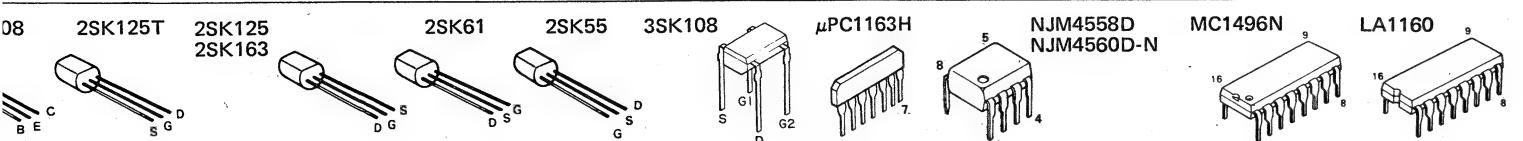
Weight (Net) 12.4 kg (27.3 lb)

Kenwood follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.

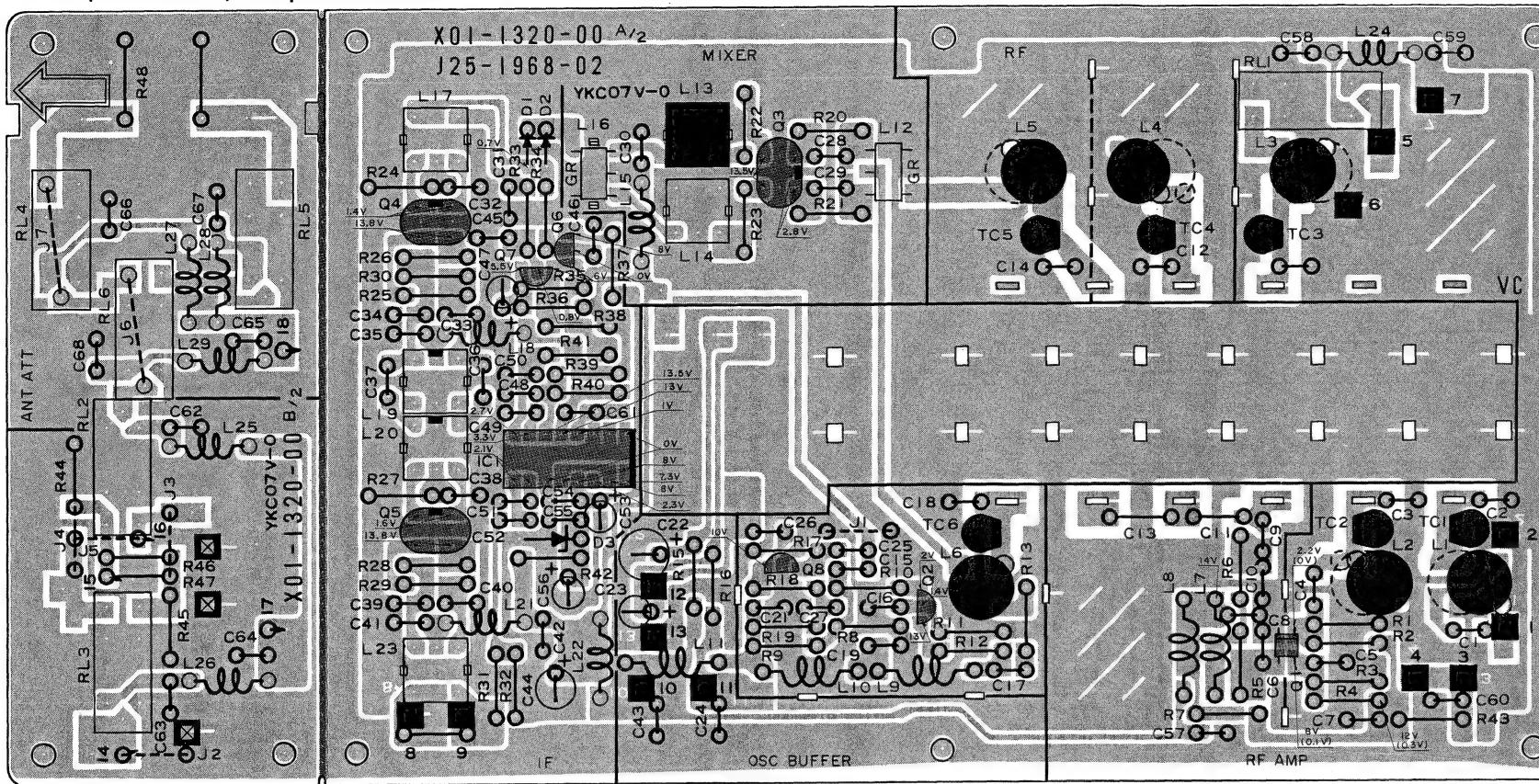
Kenwood poursuit une politique de progrès constants en ce qui concerne le développement. Pour cette raison, les spécifications sont sujettes à modifications sans préavis.

Kenwood strebt ständige Verbesserungen in der Entwicklung an. Daher bleiben Änderungen der technischen Daten jederzeit vorbehalten.

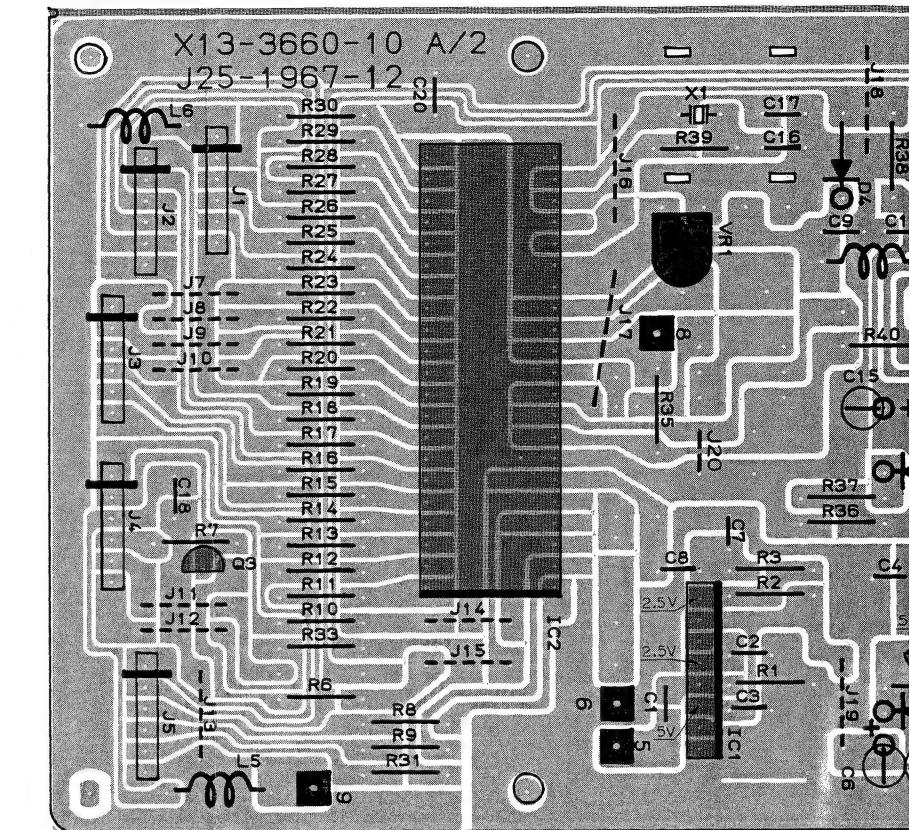
- DC voltages are measured by a VOM of 25k Ω /V input impedance.
- Les tensions de courant continu sont mesurées par un multimètre d'une impédance d'entrée de 25k Ω /V.
- Die Gleichstrom-Spannungen werden durch ein Vielfachmeßgerät von 25k Ω /V Eingangs-Impedanz gemessen.



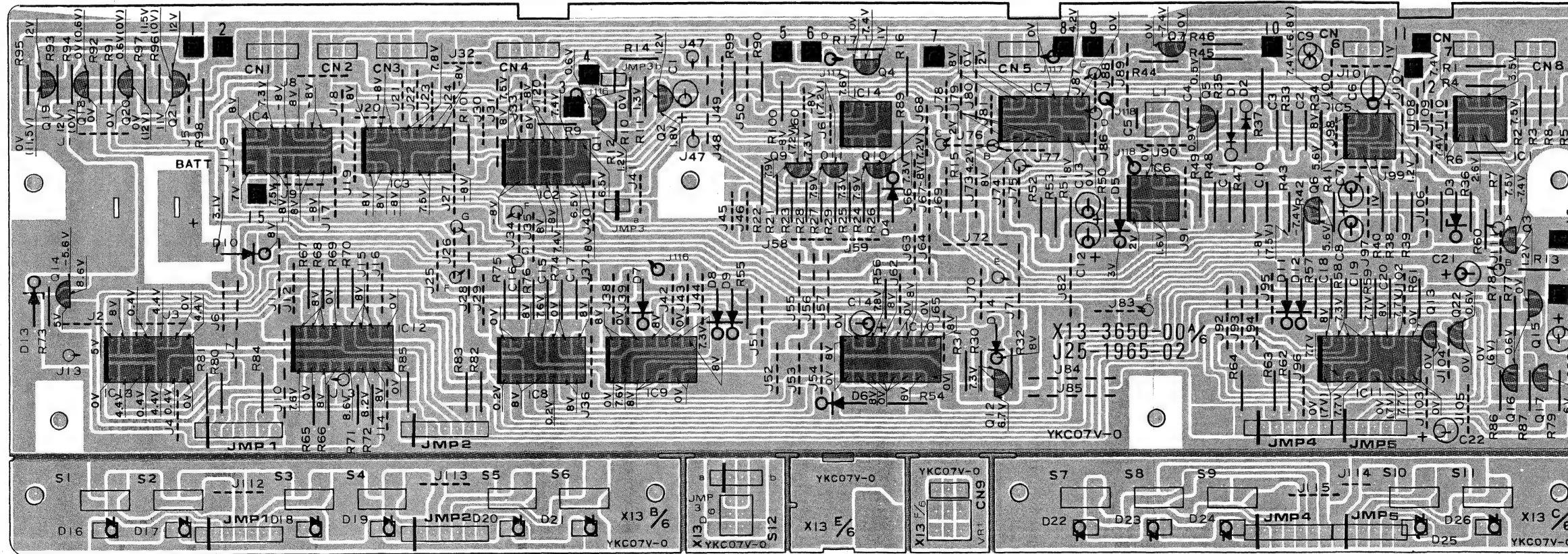
FM RF (X01-1320-11) Component side view



SUB (X13-3660-10) Component side view



SUB (X13-3650-11) Component side view

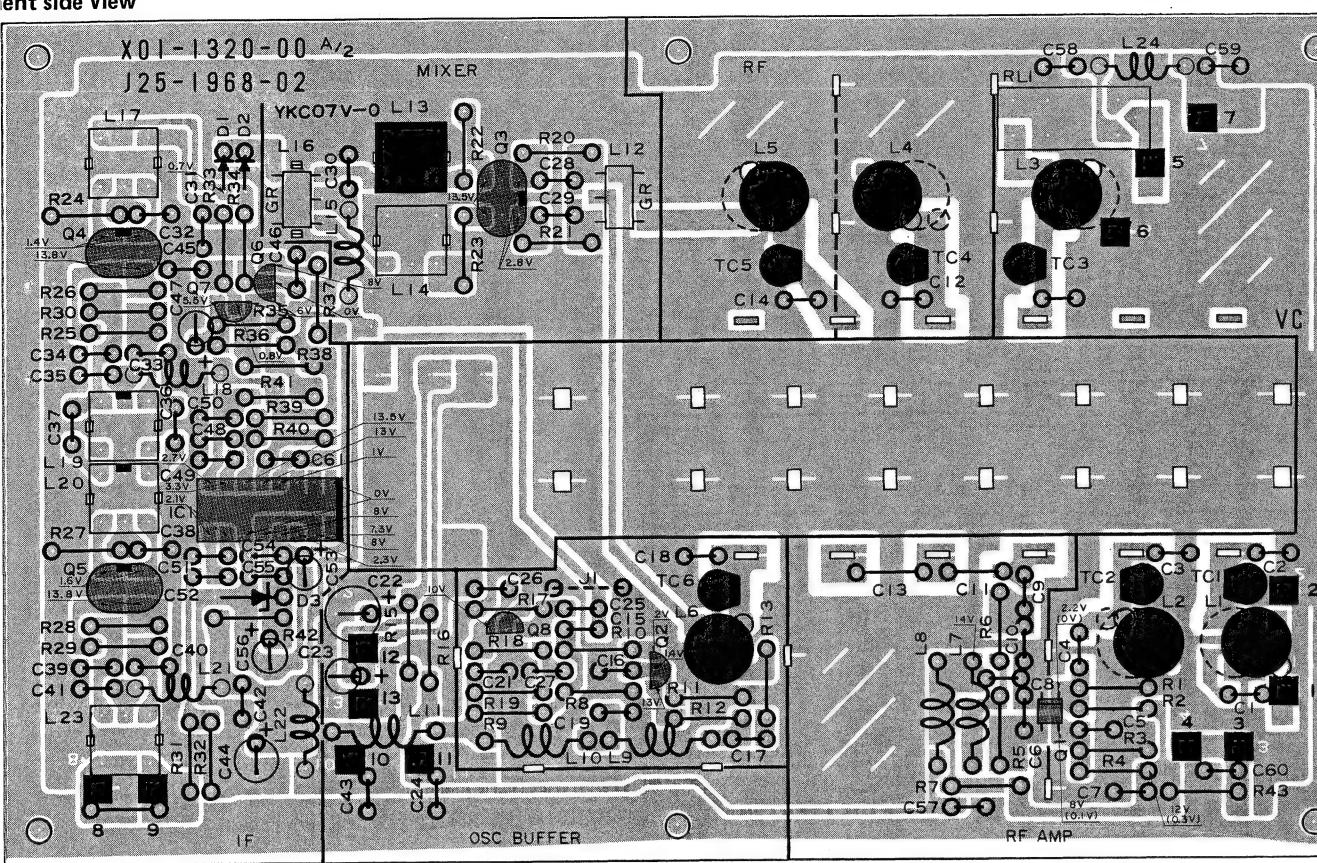


Refer to the schematic diagram for the
The PC board drawing is viewed from

L-02T L-02T

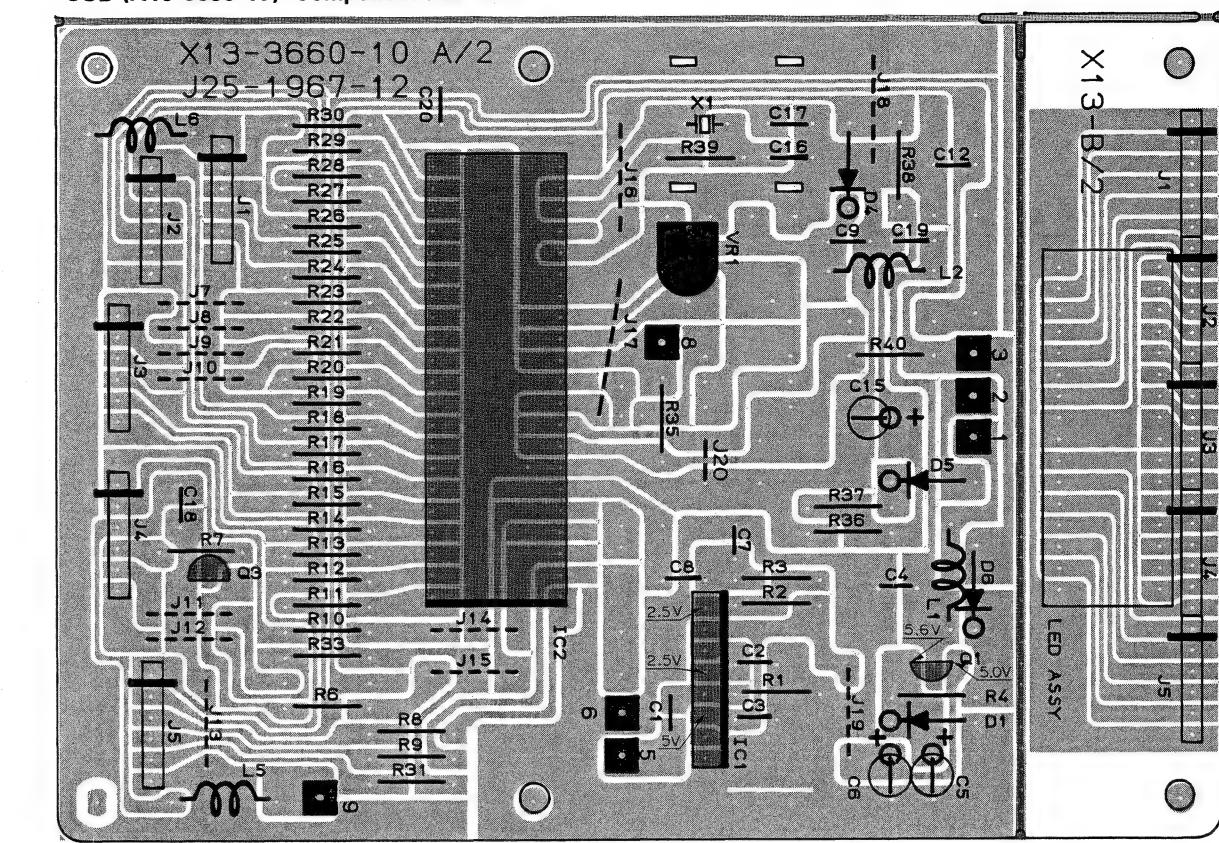
PC BOARD

ent side view

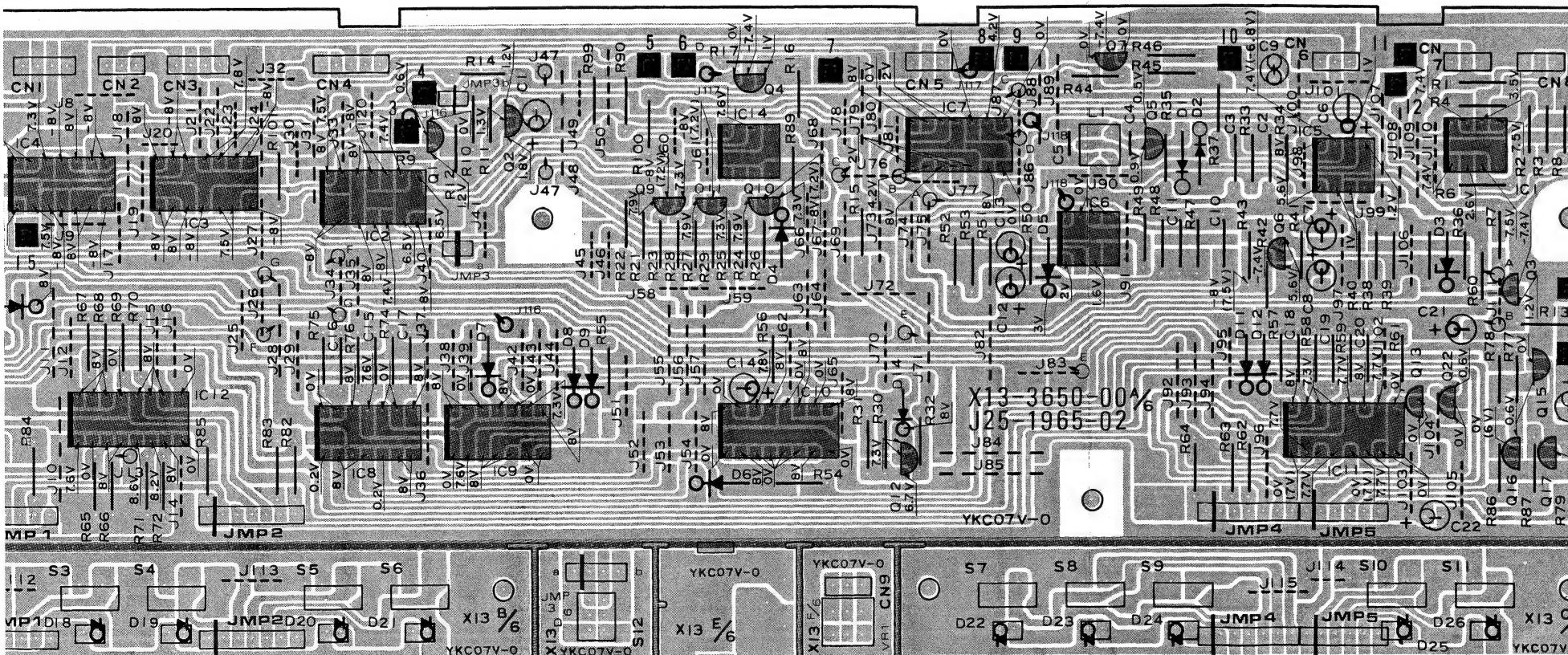


L-02T L-02T

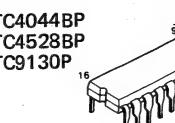
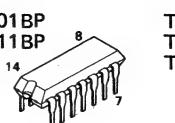
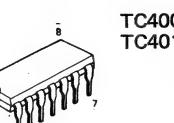
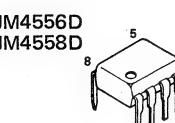
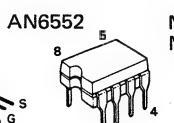
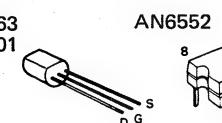
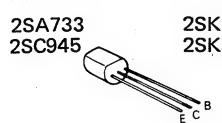
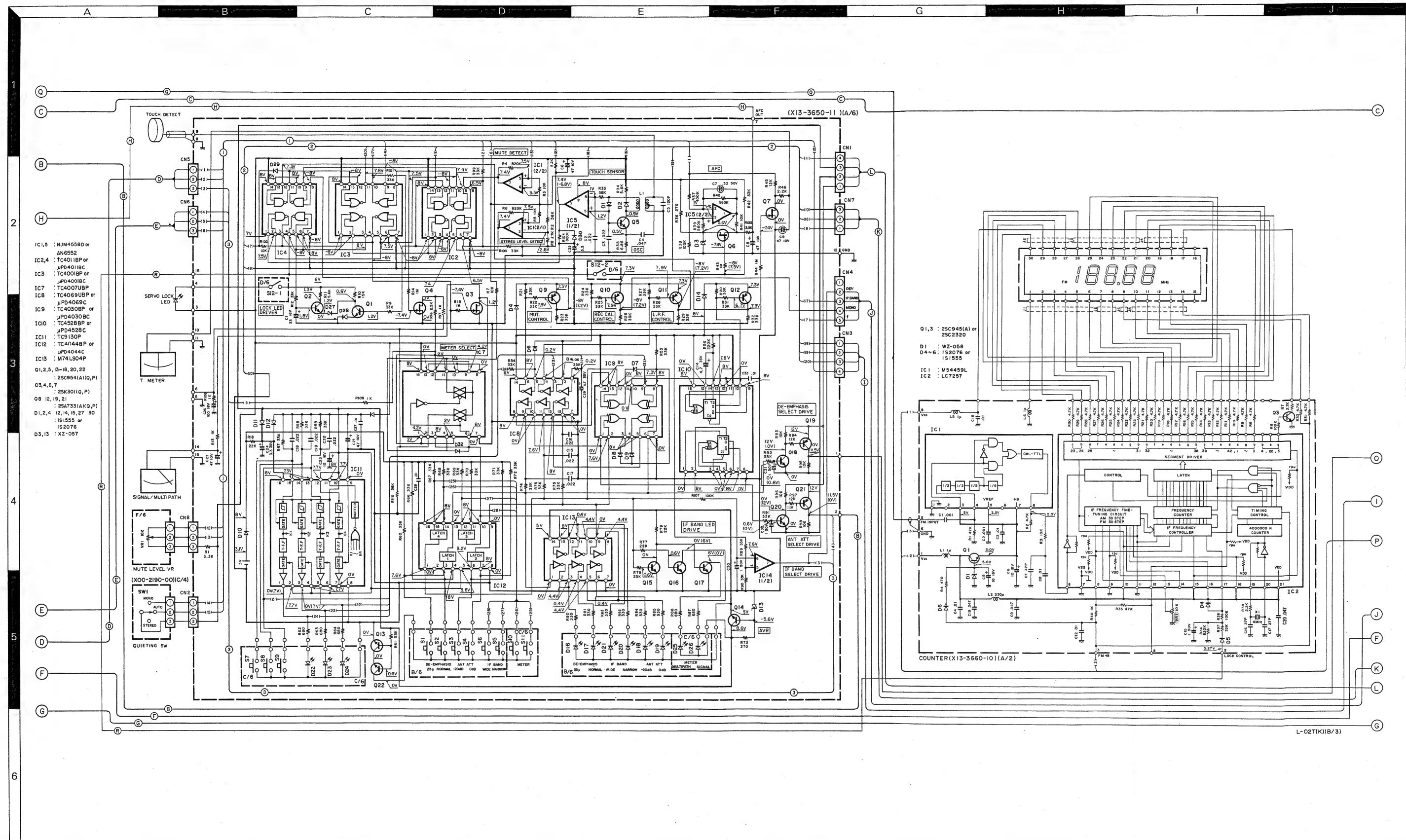
SUB (X13-3660-10) Component side view



t side view

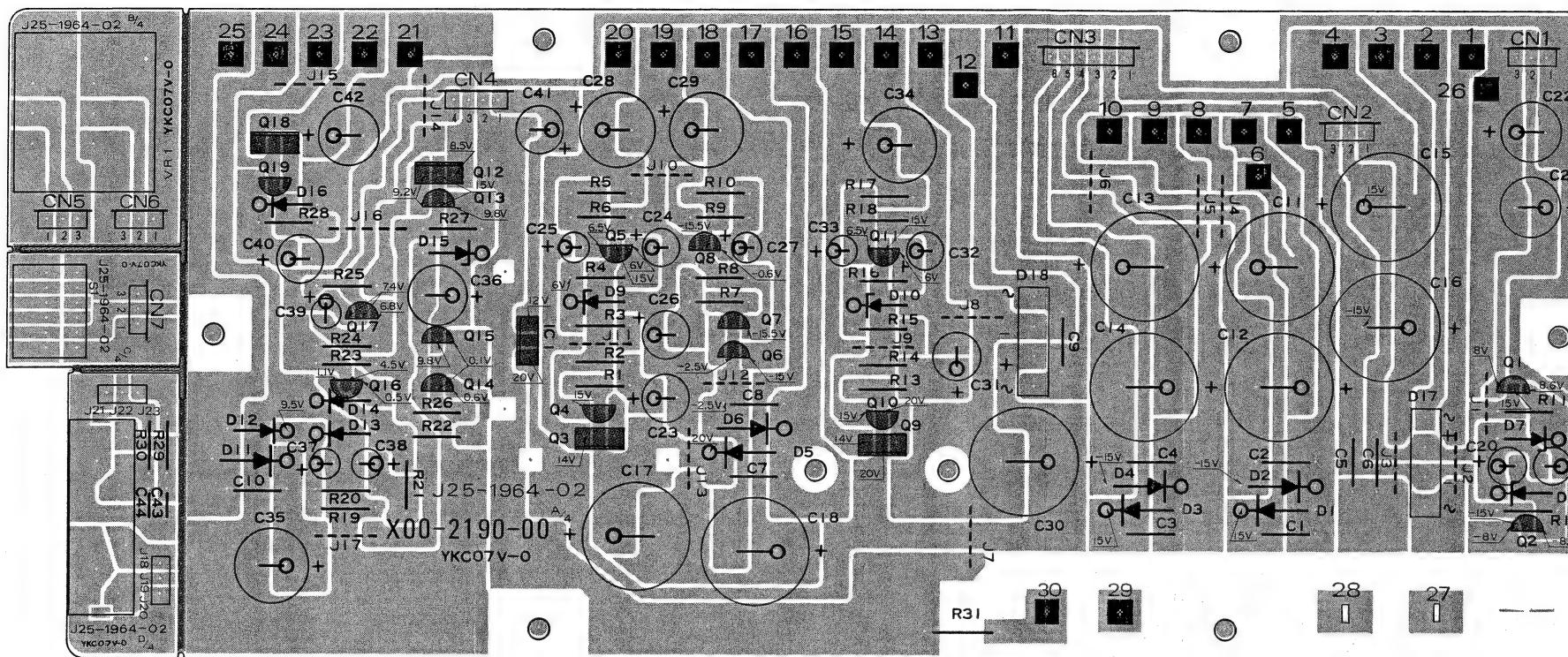


Refer to the schematic diagram for the values of resistors and capacitors.
The PC board drawing is viewed from the side easy to check.

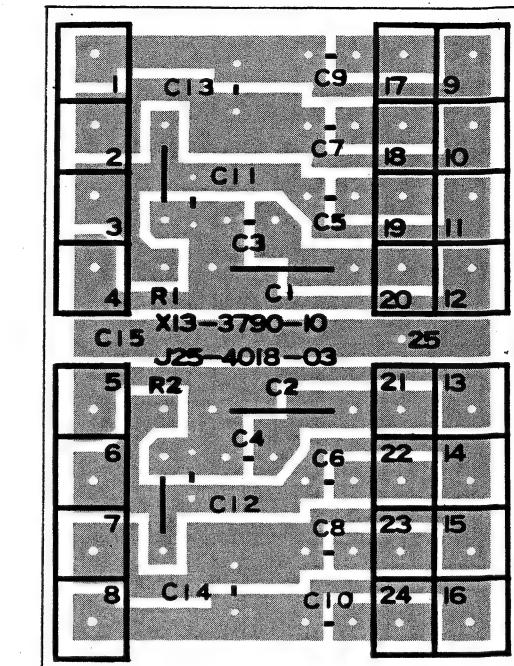


- DC voltages are measured by a VOM of $25k\Omega/V$ input impedance.
- Les tensions de courant continu sont mesurées par un multimètre d'une impédance d'entrée de $25k\Omega/V$.
- Die Gleichstrom-Spannungen werden durch ein Vielfachmeßgerät von $25k\Omega/V$ Eingangs-Impedanz gemessen.

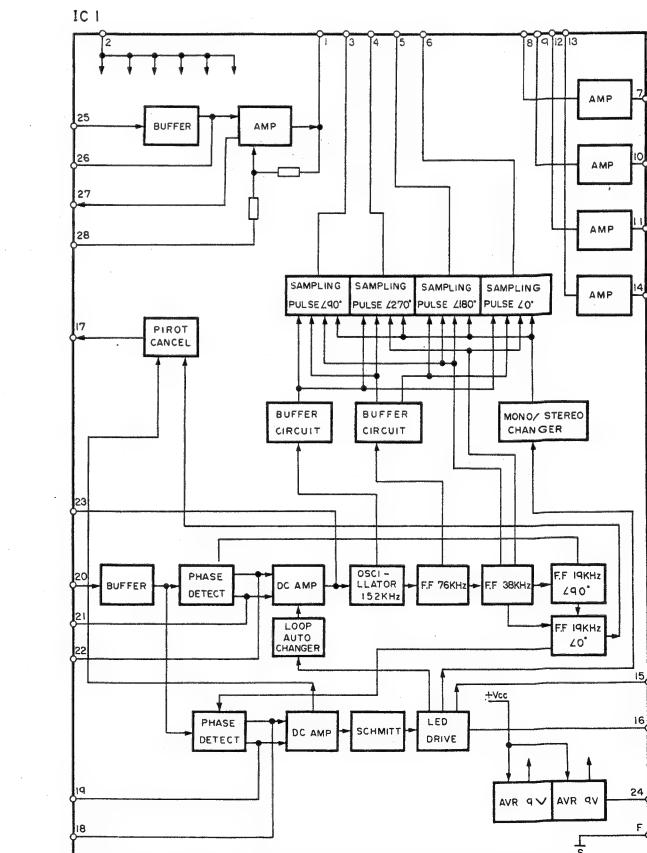
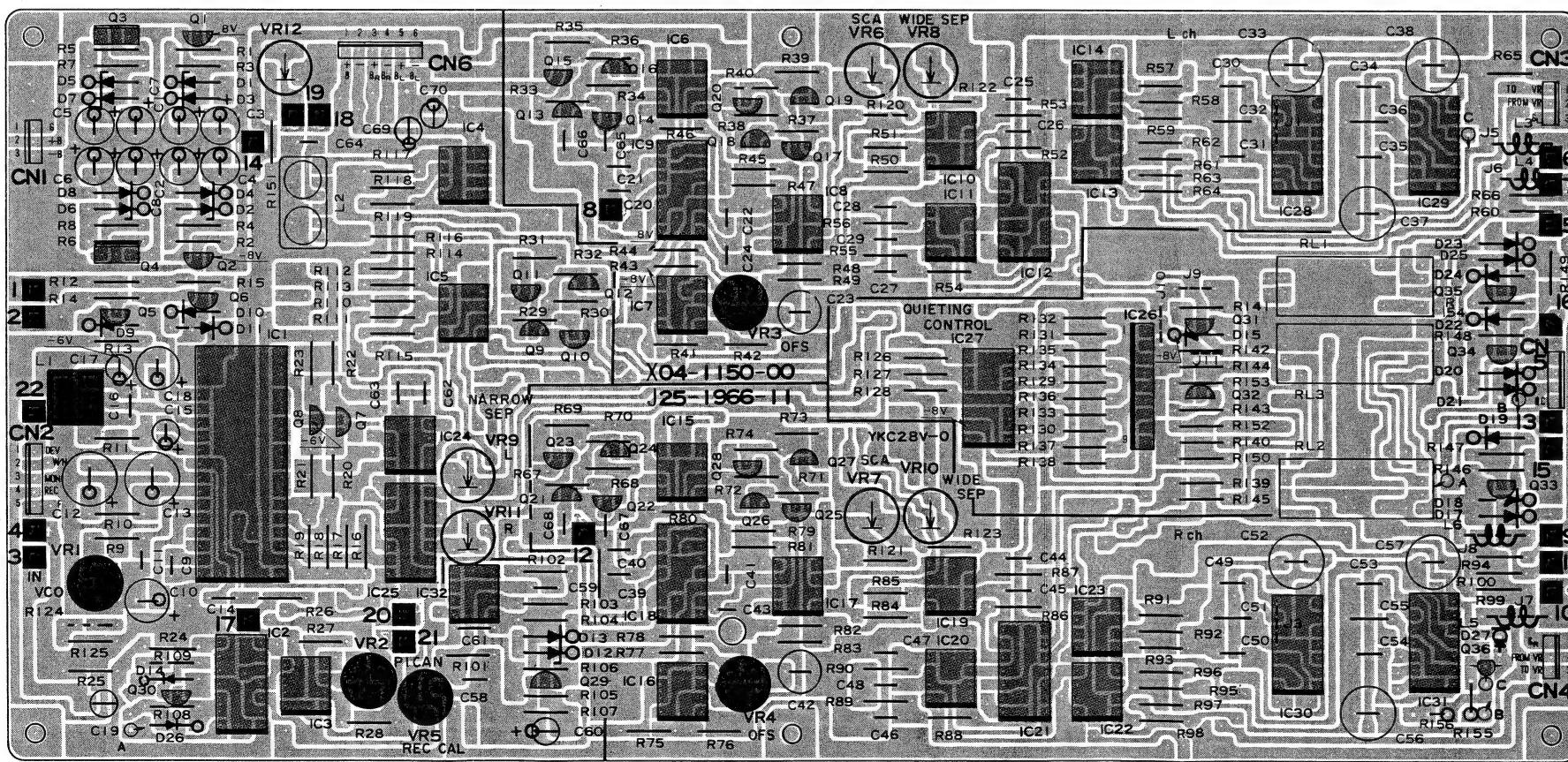
POWER SUPPLY (X00-2190-11) Component side view



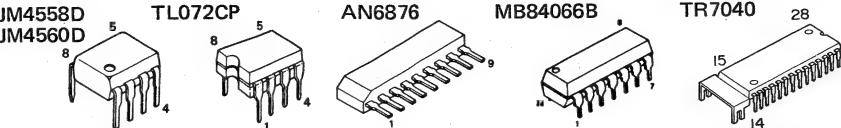
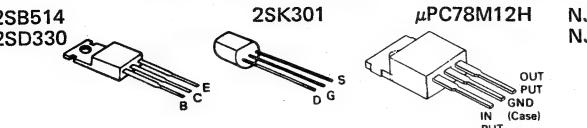
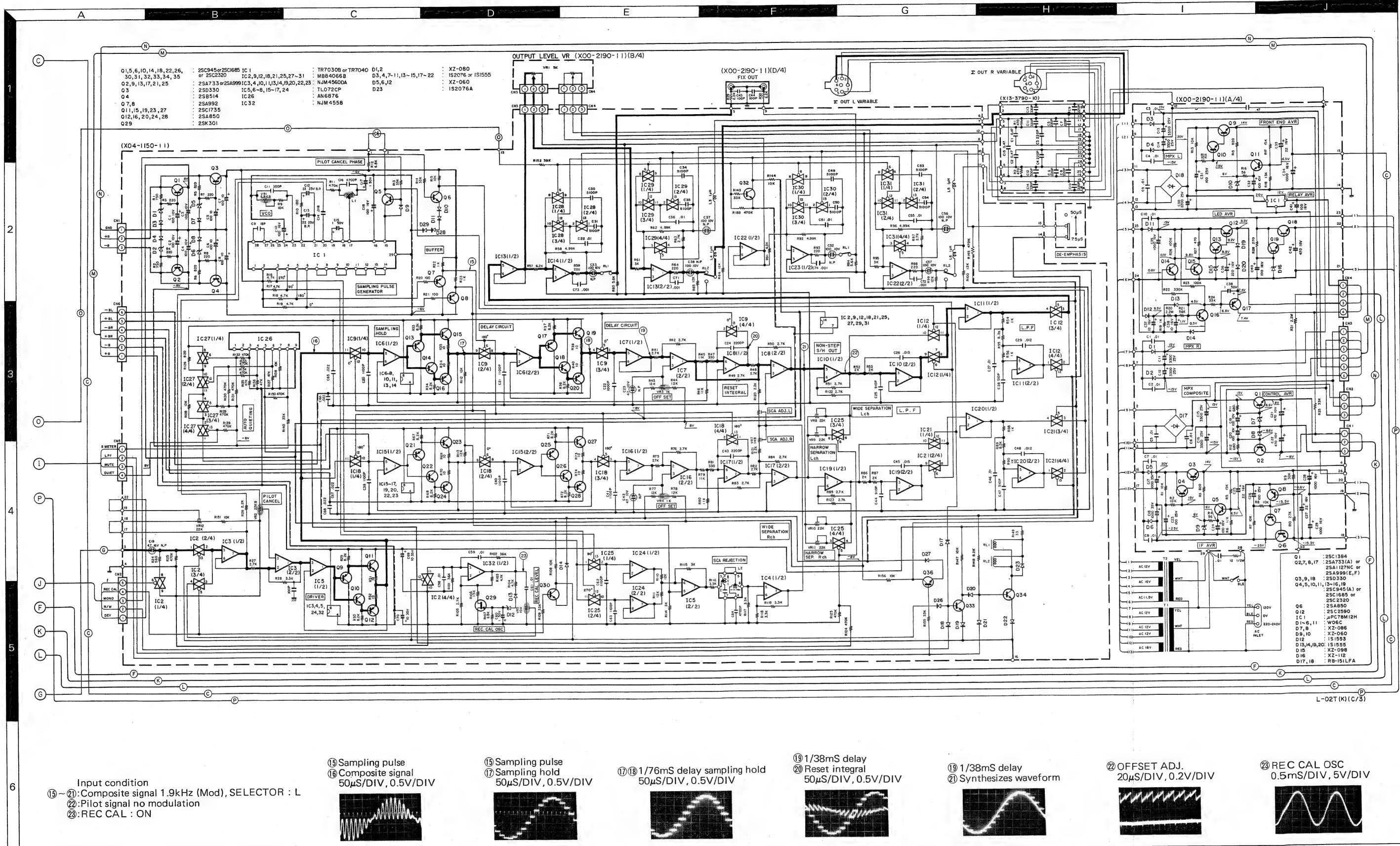
SUB (X13-3790-10) Component side view



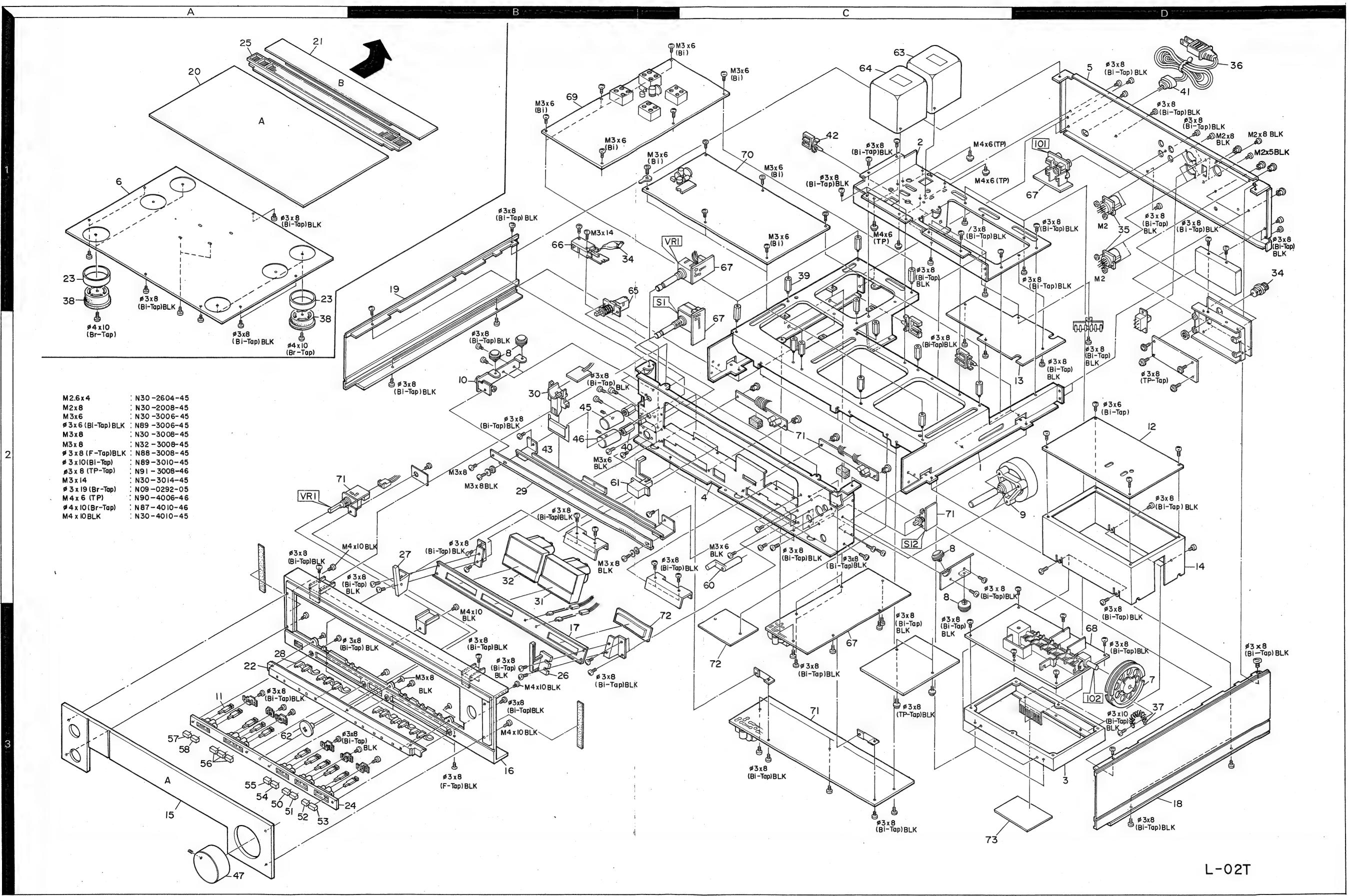
MPX (X04-1150-11) Component side view



Refer to the schematic diagram for the values of resistors and capacitors.
The PC board drawing is viewed from the side easy to check.



- DC voltages are measured by a VOM of 25kΩ/V input impedance.
- Les tensions de courant continu sont mesurées par un multimètre d'une impédance d'entrée de 25kΩ/V.
- Die Gleichstrom-Spannungen werden durch ein Vielfachmessgerät von 25kΩ/V Eingangs-Impedanz gemessen.



PARTS LIST

★ New Parts

Parts without **Parts No.** are not supplied.Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.Teile ohne **Parts No.** werden nicht geliefert.

INSTRUCTION FOR PARTS LIST

Ref. No.	Parts No.	Description	Re-
参照番号	部品番号	部品名 / 規格	marks 備考
②	1, 3A	MAIN CHASSIS ASS'Y	
①	2, 2A	FRONT CHASSIS	
3, 2A	-	FLUOR DISPLAY HOLDER	
4, 1A, 1B	-	FRONT PANEL	
5, 1A	A20-1666-08	FRONT PANEL ASS'Y	④
⑤	PS3	PUSH SW. (SELECTOR) 111	①
RS1	S42-3201-08	ROTARY SW. (FUNC.) 105	
RL1	S51-2204-08	RELAY FIG.104	①

① Exploded view drawing No.

② Position in exploded view.

③ Symbol of new parts

④ Area to which parts are shipped. Example: A20-1666-08 is the part No. of FRONT PANEL ASS'Y for the "K" type products (for U.S.A.). When this column is blank, it means that the same type of parts (same parts No.) are used for the products shipped to all areas.

⑤ Reference No. in schematic diagram.

⑥ Abbreviation of "ceramic capacitor"

All capacitors and resistors are listed using abbreviations.

Abbreviations

* Abbreviations of capacitors (Parts No. with initial letter "C").

ELECTRO Electrolytic capacitor

LL-ELEC Low leak electrolytic capacitor

NP-ELEC Non-pole electrolytic capacitor

MICA Mica capacitor

POLYSTY Polystyrene capacitor

MYLAR Mylar capacitor

CERAMIC Ceramic capacitor

TANTAL Tantalum capacitor

MF Metallized film capacitor

MP Metallized paper capacitor

OIL Oil capacitor

The unit "UF" is used in lieu of "μF"

* Abbreviations of resistors (Parts No. with initial letters "R").

RC Carbon composition resistor

RD Carbon film resistor

FL-PROOF RD Flame-proof carbon film resistor

RW Wire wound power resistor

FL-PROOF RS Flame-proof metal oxide film resistor

RN Metal film resistor

FUSE-RESIST Resistor with fuse function

2B Rated wattage 1/8W

2E Rated wattage 1/4W

2H Rated wattage 1/2W

3A Rated wattage 1W

3D Rated wattage 2W

3F Rated wattage 3W

3G Rated wattage 4W

3H Rated wattage 5W

All resistor values are indicated with the unit (Ω) omitted.

* Abbreviations common to capacitors and resistors.

C ± 0.25pF (Used for capacitors only)

D ± 0.5pF (Used for capacitors only)

F ± 1%

G ± 2%

J ± 5%

K ± 10%

M ± 20%

Z +80% -20% (Used for capacitors only)

P +100% -0% (Used for capacitors only)

Resistors RD (carbon composition resistors) are not listed in the parts list. For values, refer to the schematic diagram.

Ref. No.	Parts No.	Description	Re-
参照番号	部品番号	部品名 / 規格	marks 備考
L-02T (UNIT)			
1 2C	NO STOCK	MAIN CHASSIS	
2 1C	NO STOCK	SUB CHASSIS	
3 3D	NO STOCK	METALLIC FRAME	
4 2C	NO STOCK	SUB PANEL	
5 1D	NO STOCK	REAR PANEL	
6 1A	NO STOCK	BOTTOM PLATE	
7 3D	NO STOCK	PULLEY	
8 2C	NO STOCK	PULLEY ASSY	
9 3D	NO STOCK	DIAL SHAFT ASSY	
10 2B	NO STOCK	SHAFY ASSY	
11 3A	NO STOCK	SHAFT	
15 3A	A20-3298-03	FRONT PANEL ASSY (A)	
16 3B	A20-3158-03	FRONT PANEL ASSY (B)	
17 3A	A21-0380-03	DRESSING PANEL	
18 3D	A50-0099-03	SIDE PLATE (R)	
19 1B	A50-0100-03	SIDE PLATE (L)	
20 1A	A52-0049-03	TOP PLATE (A)	
21 1A	A52-0050-03	TOP PLATE (B)	
	B59-0018-00	SERVICE STATIONS LIST	
	B46-0055-30	WARRANTY CARD	P
	B46-0061-30	WARRANTY CARD	K
	B46-0062-30	WARRANTY CARD	U
	B46-0063-13	WARRANTY CARD MILITARY	U
	B46-0064-20	WARRANTY CARD	X
	B46-0078-03	WARRANTY CARD	E
	B50-4322-00	INSTRUCTION MANUAL	K
	B50-4322-00	INSTRUCTION MANUAL	U
	B50-4323-00	INSTRUCTION MANUAL	P
	B50-4323-00	INSTRUCTION MANUAL	MX
	B50-4324-00	INSTRUCTION MANUAL	E
22 3B	B01-0202-03	PANEL ESCUTCHEON	
23 1A	B07-0249-04	ESCUTCHEON (FOOT)	
24 3A	B07-1009-13	ESCUTCHEON (PUSH)	
25 1A	B07-1010-03	ESCUTCHEON (TOP)	
26 3B	B07-1014-04	ESCUTCHEON (R)	
27 2B	B07-1015-04	ESCUTCHEON (L)	
28 3A	B19-0233-04	INDICATOR	
29 2B	B20-0518-04	DIAL SCALE ASSY	
30 2B	B21-0051-03	DIAL POINTER ASSY	
31 2B	B31-0320-05	METER (T)	
32 2B	B31-0323-05	METER (S/M)	
	C46-1747-46	MYLAR 0.47UF	K
	C55-1722-38	CERAMIC 0.022UF	Z
	C91-0079-05	CERAMIC 0.01UF	AC125V
	E03-0102-05	3P INLET	
	E07-0603-05	CYLINDRICAL PLUG	
	E14-0007-05	PHONO PLUG	
	E19-0211-05	PLUG	
	E21-0007-05	TERMINAL	E
	E22-0416-05	LUG TYPE TERMINAL STRIP	
	E30-0505-05	AUDIO CORD	
34 1D	E04-0001-05	RECEPTACLE	
35 1D	E06-0605-05	OUTPUT JACK	
36 1D	E30-0687-05	POWER CORD	KP
36 1D	E30-1305-15	POWER CORD	UM
36 1D	E30-1329-05	POWER CORD	E
36 1D	E30-1342-05	POWER CORD	X
37 3D	G01-0368-04	COILED SPRING	

E : Scandinavia & Europe H : Audio Club K : USA P : Canada
 S : South Africa T : England U : PX (Far East, Hawaii)
 [UE] : AAFES (Europe) X : Australia M : Other Areas

PARTS LIST

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Ref. No.	Parts No.	Description	Re-
参照番号	部品番号	部品名 / 規格	marks 備考
L-02T (UNIT)			
-	H01-3393-04	CARTON BOX	*
-	H10-1604-02	POLYSTYRENE FIXTURE	*
-	H20-0447-04	COVER	
-	H25-0078-04	(235X315)	
-	H25-0096-04	BAG	
-	H25-0097-04	BAG	
38 1A	J02-0098-04	FOOT	
39 1C	J32-0265-04	STUD	
40 2B	J32-0271-04	STUD	
41 1D	J42-0083-05	BUSHING	
42 1C	J61-0024-05	WIRE BAND	
43 2B	J90-0107-03	RAIL	
45 2B	K21-0391-04	KNOB OUTPUT	*
46 2B	K21-0392-04	KNOB QUIETING	*
47 3A	K21-0393-04	KNOB TUNING	*
51 3A	K27-0725-04	KNOB NORMAL	*
52 3A	K27-0733-04	KNOB 0 DB	*
53 3A	K27-0734-04	KNOB -20 DB	*
54 3A	K27-0728-04	KNOB MULTIPATH	*
55 3A	K27-0735-04	KNOB 25U	*
56 3A	K27-0730-04	KNOB ON/OFF	*
57 3A	K27-0731-04	KNOB WIDE	*
58 3A	K27-0732-04	KNOB NARROW	*
59 3A	K27-0736-04	KNOB SIGNAL	*
60 2C	K27-0737-04	KNOB LOCK	*
61 2B	K27-0738-04	KNOB POWER	*
62 3A	K29-0465-04	KNOB MUTE LEVEL	*
63 1C	L01-2594-05	POWER TRANS	*
64 1C	L01-2604-05	POWER TRANS	*
	S31-2061-05	SLIDE SWITCH	
65 1B	S40-0006-05	PUSH SWITCH	
66 1B	S49-2003-05	SENSITIVE SWITCH	
	T90-0122-05	ANTENNA	
	T90-0202-05	FM INDOOR ANTENNA	
	V11-0273-05	1S2076A	
67 3C	X00-2190-11	POWER SUPPLY PCB ASSY	*
68 3D	X01-1320-11	FM RF PCB ASSY	*
69 1B	X02-1210-11	FM IF PCB ASSY	*
70 1B	X04-		

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Ref. No.	Parts No.	Description	Re- marks
参照番号	部品番号	部品名 / 規格	備考
C15	C71-1747-05	CERAMIC 47PF J	
C16	C52-1710-26	CERAMIC 0.001UF K	
C17	C71-1747-05	CERAMIC 47PF J	
C18	C63-1715-05	CERAMIC 15PF J	
C19	C52-1710-26	CERAMIC 0.001UF K	
C21	C52-1710-26	CERAMIC 0.001UF K	
C22	C90-0588-05	ELECTRO 100UF 16WV	
C23	C90-0587-05	ELECTRO 47UF 16WV	
C24	C55-1710-38	CERAMIC 0.01UF Z	
C25	C71-1702-01	CERAMIC 2PF C	
C26	C71-1747-05	CERAMIC 47PF J	
C27	C52-1710-26	CERAMIC 0.001UF K	
C28 -32	C55-1710-38	CERAMIC 0.01UF Z	
C33 -34	C71-1710-02	CERAMIC 10PF D	
C35	C55-1710-38	CERAMIC 0.01UF Z	
FM IF (X02-1210-11)			
C36 -37	C63-1707-02	CERAMIC 7PF D	
C38	C55-1710-38	CERAMIC 0.01UF Z	
C39 -40	C71-1710-02	CERAMIC 10PF D	
C41 -43	C55-1710-38	CERAMIC 0.01UF Z	
C44	C90-0587-05	ELECTRO 47UF 16WV	
C45 -46	C55-1710-38	CERAMIC 0.01UF Z	
C47	C90-1201-05	ELECTRO 1UF 50WV	
C48 -52	C55-1710-38	CERAMIC 0.01UF Z	
C53	C90-0595-05	ELECTRO 4.7UF 35WV	
C54 -55	C55-1710-38	CERAMIC 0.01UF Z	
C56	C90-0581-05	ELECTRO 47UF 10WV	
C57	C55-1710-38	CERAMIC 0.01UF Z	
C61	C71-1747-05	CERAMIC 47PF J	
C62 -64	C52-1710-26	CERAMIC 0.001UF K	
TC1 -6	C05-0302-05	TRIMMER CAPACITOR	
L1	L31-0381-05	RF COIL	
L2 -4	L31-0379-05	RF COIL	
L5	L31-0380-05	RF COIL	
L6	L32-0234-05	OSCILLATING COIL	
L7 -11	L33-0025-05	CHOKE COIL	
L12	L39-0098-05	COIL	
L13 -14	L30-0381-05	IFT	
L15	L40-2292-41	INDUCTOR	
L16	L39-0098-05	COIL	
L17	L30-0343-05	IFT	
L18	L40-2292-41	INDUCTOR	
L19 -20	L30-0341-05	IFT	
L21 -22	L40-2292-41	INDUCTOR	
L23	L30-0343-05	IFT	
L25 -26	L40-1092-41	INDUCTOR	
R5 -6	R42-1247-05	FL-PROOF 47 J 2E	
R7	R42-1210-15	FL-PROOF RD100 J 2E	
R11	R42-1268-05	FL-PROOF RD68 J 2E	
R12 -13	R42-1247-05	FL-PROOF 47 J 2E	
R15	R42-1212-15	FL-PROOF RD120 J 2E	
R16	R42-1215-15	FL-PROOF RD150 J 2E	
R19	R42-1210-15	FL-PROOF RD100 J 2E	
R20 -21	R48-2270-03	RN 270 F 2E	
R22 -23	R42-1247-05	FL-PROOF RD47 J 2E	
R24	R42-1268-05	FL-PROOF RD68 J 2E	
R25 -26	R42-1222-05	FL-PROOF RD22 J 2E	
R27	R42-1268-05	FL-PROOF RD68 J 2E	
R28 -29	R42-1222-05	FL-PROOF RD22 J 2E	
R33 -34	R42-1239-05	FL-PROOF RD39 J 2E	
R39	R42-1210-15	FL-PROOF RD100 J 2E	

Ref. No.	Parts No.	Description	Re- marks
参照番号	部品番号	部品名 / 規格	備考
R40	R42-1215-15	FL-PROOF RD150 J 2E	
R42	R42-1222-15	FL-PROOF RD220 J 2E	
R43	R42-1210-15	FL-PROOF RD100 J 2E	
R48	R40-8310-68	RC 10M M 2H	
RL2 -3	S51-1020-05	RELAY	
D1 -2	V11-1263-06	BA379	
D3	V11-4163-46	XZ-080	
IC1	V30-0709-10	LA1160	
Q1	V09-0161-10	3SK108	
Q2	V03-2408-00	2SC2408	
Q3 -5	V09-0136-20	2SK125T	
Q6 -7	V01-0733-30	2SA733(A) (R, Q)	
Q8	V09-0124-10	2SK61	
FM IF (X02-1210-11)			
C1 -15	C55-1710-38	CERAMIC 0.01UF Z	
C16	C71-1733-15	CERAMIC 330PF J	
C17 -32	C55-1710-38	CERAMIC 0.01UF Z	
C33 -34	C63-1710-02	CERAMIC 10PF D	
C35 -47	C55-1710-38	CERAMIC 0.01UF Z	
C49	C55-1710-38	CERAMIC 0.01UF Z	
C50 -51	C63-1733-05	CERAMIC 33PF J	
C52 -54	C55-1710-38	CERAMIC 0.01UF Z	
C55	C90-0581-05	ELECTRO 47UF 10WV	
C56	C46-1712-25	MYLAR 0.0012UF J	
C57	C46-1722-25	MYLAR 0.0022UF J	
C58 -59	C55-1710-38	CERAMIC 0.01UF Z	
C60	C46-1718-35	MYLAR 0.018UF J	
C61	C46-1710-35	MYLAR 0.01UF J	
C62 -63	C55-1710-38	CERAMIC 0.01UF Z	
C64	C46-1710-35	MYLAR 0.01UF J	
C65	C46-1747-25	MYLAR 0.0047UF J	
C66	C46-1710-35	MYLAR 0.01UF J	
C67	C90-1201-05	ELECTRO 1UF 50WV	
C68	C26-1410-57	NP-ELEC 1UF 25WV	
C70 -71	C55-1710-38	CERAMIC 0.01UF Z	
C72	C47-1713-25	POLYSTY 1300PF J	
C73	C47-1715-25	POLYSTY 1500PF J	
C74	C47-1747-15	POLYSTY 470PF J	
C75 -76	C55-1710-38	CERAMIC 0.01UF Z	
C77	C47-1716-25	POLYSTY 1600PF J	
C78	C47-1747-15	POLYSTY 470PF J	
C79 -80	C55-1710-38	CERAMIC 0.01UF Z	
C81	C90-0581-05	ELECTRO 47UF 10WV	
C82	C55-1710-38	CERAMIC 0.01UF Z	
C84 -90	C55-1710-38	CERAMIC 0.01UF Z	
C92 -95	C55-1710-38	CERAMIC 0.01UF Z	
C96	C46-1710-25	MYLAR 0.001UF J	
C97 -99	C55-1710-38	CERAMIC 0.01UF Z	
C100	C46-1710-25	MYLAR 0.001UF J	
C101 -103	C55-1710-38	CERAMIC 0.01UF Z	
C104	C46-1710-25	MYLAR 0.001UF J	
C105 -107	C55-1710-38	CERAMIC 0.01UF Z	
C108	C46-1710-25	MYLAR 0.001UF J	
C109 -110	C55-1710-38	CERAMIC 0.01UF Z	
C111	C52-1756-16	CERAMIC 560PF K	
C112	C90-1201-05	ELECTRO 1UF 50WV	
C113 -115	C46-1710-35	MYLAR 0.01UF J	
C116	C47-1747-25	POLYSTY 4700PF J	
C117	C90-1201-05	ELECTRO 1UF 50WV	
C119	C47-1747-25	POLYSTY 4700PF J	

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C120	C90-1201-05	ELECTRO 1UF 50WV	
C122	C47-1747-25	POLYSTY 4700PF J	
C123 -127	C90-1201-05	ELECTRO 1UF 50WV	
C128	C90-0582-05	ELECTRO 100UF 10WV	
C129	C46-1710-35	MYLAR 0.01UF J	
C130 -131	C55-1710-38	CERAMIC 0.01UF Z	
C132	C71-1722-05	CERAMIC 22PF J	
C133	C47-1710-15	POLYSTY 100PF J	
C134	C55-1710-38	CERAMIC 0.01UF Z	
C135	C71-1712-15	CERAMIC 120PF J	
CF1 -2	L72-0126-05	CERAMIC FILTER	
L1	L30-0375-05	IFT	

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参照番号	部品番号	部品名 / 規格		備考
C55	C49-2010-34	POLYPRO 0.01UF	G	
C56 ,57	C26-1010-77	NP-ELEC 100UF	10WV	
C58 ,59	C46-1710-35	MYLAR 0.01UF	J	
C60	C90-1201-05	ELECTRO 1UF	50WV	
C61	C46-1710-35	MYLAR 0.01UF	J	
C62 ,63	C47-1711-25	POLYSTY 1100PF	J	
C64	C49-2047-24	POLYPRO 0.0047UF	G	
C65 ,68	C55-1722-38	CERAMIC 0.022UF	Z	
C69 ,70	C90-1213-05	ELECTRO 10UF	35WV	
C71 ,74	C46-1710-25	MYLAR 0.001UF	J	
-	E40-0373-05	PIN CONNECTOR 3P		
-	E40-0473-05	PIN CONNECTOR 4P		
-	E40-0573-05	PIN CONNECTOR 5P		
-	E40-0673-05	PIN CONNECTOR 6P		
J1	E31-1449-05	CONNECTING WIRE		
J3	E31-1449-05	CONNECTING WIRE		
J5 ,8	E31-0055-05	CONNECTING WIRE		
J9	E31-1449-05	CONNECTING WIRE		
J10 ,11	E31-1449-05	CONNECTING WIRE		
L1	L35-0061-05	MPX COIL		
L2	L79-0157-05	FILTER		
L3 ,6	L40-1092-41	INDUCTOR		
R58	R48-2499-13	RN 4.99K F 2E		
R62	R48-2499-13	RN 4.99K F 2E		
R92	R48-2499-13	RN 4.99K F 2E		
R96	R48-2499-13	RN 4.99K F 2E		
VR1	R12-2024-05	TRIMMING POT. 6.8K		
VR2	R12-3051-05	TRIMMING POT. 22K		
VR3 ,4	R12-1038-05	TRIMMING POT. 1K		
VR5	R12-3045-05	TRIMMING POT. 10K		
VR6 ,7	R12-1038-05	TRIMMING POT. 1K		
RL1	S51-2037-05	RELAY		
RL2	S51-2408-05	RELAY		
D1 ,2	V11-4163-46	XZ-080		
D3 ,4	V11-0271-05	1S2076		
D5 ,6	V11-4101-20	XZ-060		
D7 ,11	V11-0271-05	1S2076		
D12	V11-4101-20	XZ-060		
D13 ,15	V11-0271-05	1S2076		
D13 ,14	V11-0271-05	1S2076		
D17 ,22	V11-0271-05	1S2076		
D21 ,22	V11-0271-05	1S2076		
D23	V11-0273-05	1S2076A		
D26 ,29	V11-0271-05	1S2076		
D27 ,29	V11-0271-05	1S2076		
IC1	V30-0784-10	TR7040		
IC2	V30-0516-10	M884066B		
IC3 ,4	V30-0387-10	NJM4560D(A)		
IC5 ,8	V30-0301-50	TL072CP		
IC9	V30-0516-10	M884066B		
IC10,11	V30-0387-10	NJM4560D(A)		
IC12	V30-0516-10	M884066B		
IC13,14	V30-0387-10	NJM4560D(A)		
IC15-17	V30-0301-50	TL072CP		
IC18	V30-0516-10	M884066B		
IC19,20	V30-0387-10	NJM4560D(A)		
IC21	V30-0516-10	M884066B		
IC22,23	V30-0387-10	NJM4560D(A)		
IC24	V30-0301-50	TL072CP		
IC25	V30-0516-10	M884066B		
IC26	V30-0697-10	AN6876		

Ref. No.	Parts No.	Description		Re-marks
参照番号	部品番号	部品名 / 規格		備考
IC27	V30-0516-10	MB84066B		
IC27-31	V30-0516-10	MB84066B		
IC29	V30-0516-10	MB84066B		
IC31	V30-0516-10	MB84066B		
IC32	V30-1020-26	NJM4558D		
Q1	V03-0945-80	ZSC945(A)(Q,P)		
Q2	V01-0733-40	2SA733(A)(Q,P)		
Q3	V04-0330-20	2SD330(E,F)		
Q4	V02-0514-20	2SB514(E,F)		
Q5 ,6	V03-0945-80	ZSC945(A)(Q,P)		
Q7 ,8	V01-0992-10	2SA992(F,E)		
Q9	V01-0733-40	2SA733(A)(Q,P)		
Q10	V03-0945-80	ZSC945(A)(Q,P)		
Q11	V03-0452-05	ZSC1735		
Q12	V01-0173-05	2SA850		
Q13	V01-0733-40	2SA733(A)(Q,P)		
Q14	V03-0945-80	ZSC945(A)(Q,P)		
Q15	V03-0452-05	ZSC1735		
Q16	V01-0173-05	2SA850		
Q17	V01-0733-40	2SA733(A)(Q,P)		
Q18	V03-0945-80	ZSC945(A)(Q,P)		
Q19	V03-0452-05	ZSC1735		
Q20	V01-0173-05	2SA850		
Q21	V01-0733-40	2SA733(A)(Q,P)		
Q22	V03-0945-80	ZSC945(A)(Q,P)		
Q23	V03-0452-05	ZSC1735		
Q24	V01-0173-05	2SA850		
Q25	V01-0733-40	2SA733(A)(Q,P)		
Q26	V03-0945-80	ZSC945(A)(Q,P)		
Q27	V03-0452-05	ZSC1735		
Q28	V01-0173-05	2SA850		
Q29	V09-0160-10	ZSK301(Q,R)		
Q30 ,31	V03-0945-80	ZSC945(A)(Q,P)		
Q32 ,34	V03-0945-80	ZSC945(A)(Q,P)		
Q36	V03-0945-80	ZSC945(A)(Q,P)		

SUB (X13-3650-11)

D16 ,26	B30-0198-05	LAMP		
C1	C90-0586-05	ELECTRO 33UF	16WV	
C2 ,3	C91-0085-05	CERAMIC 0.022UF	N	
C4	C46-1747-35	MYLAR 0.047UF	J	
C5	C71-1712-15	CERAMIC 120PF	J	
C6	C90-0581-05	ELECTRO 47UF	10WV	
C7	C26-1733-47	NP-ELEC 0.33UF	50WV	
C8 ,9	C90-0581-05	ELECTRO 47UF	10WV	
C10	C46-1710-45	MYLAR 0.1UF	J	
C11	C71-1728-05	CERAMIC 27PF	J	
C12 ,13	C90-0600-05	ELECTRO 0.47UF	50WV	
C14	C90-0595-05	ELECTRO 4.7UF	35WV	
C15 ,20	C91-0085-05	CERAMIC 0.022UF	N	
C21	C90-0581-05	ELECTRO 47UF	10WV	
C22	C90-0584-05	ELECTRO 10UF	16WV	
C23	C90-0581-05	ELECTRO 47UF	10WV	
C24	C25-6533-57	LL-ELEC 3.3UF	35WV	
C25	C90-1216-05	ELECTRO 3.3UF	16WV	
C26	C90-0588-05	ELECTRO 100UF	16WV	
C27 ,28	C55-1710-38	CERAMIC 0.01UF	Z	
C29	C90-0595-05	ELECTRO 4.7UF	35WV	
C30 ,32	C90-1201-05	ELECTRO 1UF	50WV	
C33	C55-1710-38	CERAMIC 0.01UF	Z	
-	E40-0374-05	PIN CONNECTOR 3P		
-	E40-0474-05	PIN CONNECTOR 4P		

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-	E40-0574-05	PIN CONNECTOR 5P	
L1	L32-0242-05	OSCILLATING COIL	
VR1	R10-3012-05	POTENTIOMETER 10K	
S1 -11	S40-1053-05	PUSH SWITCH	
S12	S40-2122-05	PUSH SWITCH	
D1 -2	V11-0076-05	1S1555	
D3	V11-4176-76	XZ-057	
D4 -12	V11-0076-05	1S1555	
D4	V11-0076-05	1S1555	
D6 -12	V11-0076-05	1S1555	
D13	V11-4176-76	XZ-057	
D14 -15	V11-0076-05	1S1555	
D27 -30	V11-0076-05	1S1555	
IC1	V30-0405-10	AN6552	
IC2	V30-0301-70	TC4011BP	
IC3	V30-1066-06	TC4001BP	
IC4	V30-0301-70	TC4011BP	
IC5	V30-0405-10	AN6552	
IC6	V30-1020-26	NJM4558D	
IC7	V30-0698-10	TC4007UBP	
IC8	V30-0297-20	TC4069UBP	
IC9	V30-1143-06	TC4030BP	
IC10	V30-0701-10	TC4528BP	
IC11	V30-0702-10	TC9130P	
IC12	V30-0700-10	TC4044BP	
IC13	V30-0685-10	M74LS04P	
IC14	V30-0527-10	NJM4556D	
Q1 -2	V03-0945-80	ZSC945(A)(Q,P)	
Q3	V09-0160-10	ZSK301(Q,R)	
Q4	V09-0144-20	ZSK163(M,N)	
Q5	V03-0945-80	ZSC945(A)(Q,P)	
Q6 -7	V09-0160-10	ZSK301(Q,R)	
Q8 -12	V01-0733-40	ZSA733(A)(Q,P)	
Q13 -18	V03-0945-80	ZSC945(A)(Q,P)	
Q19	V01-0733-40	ZSA733(A)(Q,P)	
Q20	V03-0945-80	ZSC945(A)(Q,P)	
Q21	V01-0733-40	ZSA733(A)(Q,P)	
Q22	V03-0945-80	ZSC945(A)(Q,P)	
BA1	W09-0015-05	BATTERY	

SUB (X13-3660-10)

99 38	B38-0029-05	DISPLAY ASSY	
C1 -2	C52-1710-26	CERAMIC 0.001UF K	
C3 -4	C55-1710-38	CERAMIC 0.01UF Z	
C5 -6	C24-1210-67	ELECTRO 10UF 16WV	
C7	C71-1747-05	CERAMIC 47PF J	
C8	C55-1710-38	CERAMIC 0.01UF Z	
C9	C55-1747-38	CERAMIC 0.047UF Z	
C12	C55-1710-38	CERAMIC 0.01UF Z	
C15	C24-1710-57	ELECTRO 1UF 50WV	
C16 -17	C58-1727-05	CERAMIC 27PF J	
C18	C55-1710-38	CERAMIC 0.01UF Z	
C19 -20	C55-1747-38	CERAMIC 0.047UF Z	
L1	L40-1092-11	INDUCTOR	
L2	L40-3311-11	INDUCTOR	
L5 -6	L40-1092-11	INDUCTOR	
X1	L77-0574-05	CRYSTAL RESONATOR	

Ref. No.	Parts No.	Description	Re- marks
参照番号	部品番号	部品名 / 規格	備考
VR1	R12-3302-05	TRIMMING POT. 10K	
D1	V11-4110-90	WZ-058	
D4 -6	V11-0271-05	1S2076	
IC1	V30-0568-10	M54459L	
IC2	V30-0517-10	LC7257	
Q1	V03-0945-90	ZSC945(A)	
Q3	V03-0945-90	ZSC945(A)	

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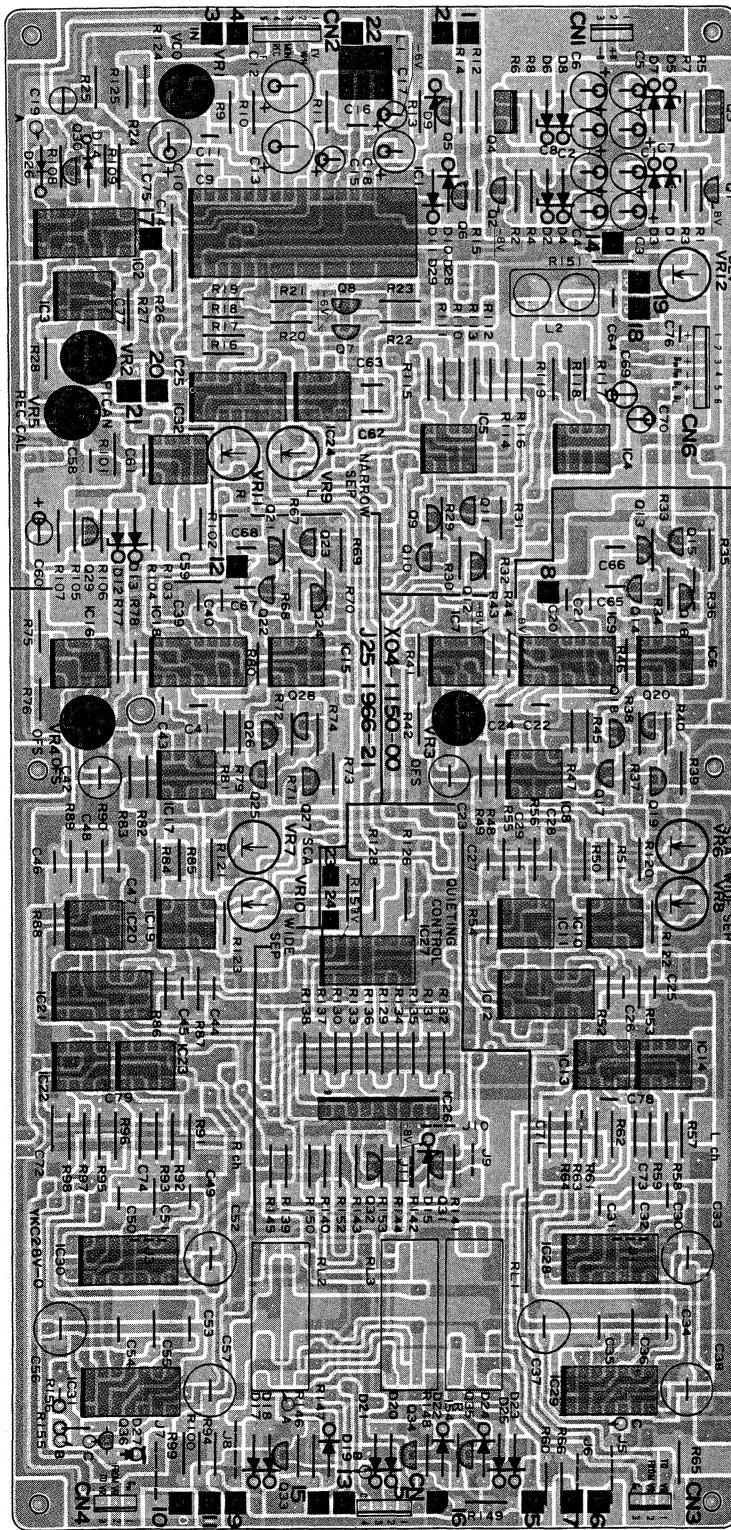


L-02T

SERVICE MANUAL

SUPPLEMENT

MPX (X04-1150-11) Component side view/MPX (X04-1150-00) 部品面



Note : The component side foil pattern is lacking from the PC BOARD (X04-1150-11) illustration. On page 18, add this sheet to the service manual.

(注)MPX (X04-1150-00)の基板図で部品面のパターンが抜けています。このシートをサービスマニュアルの14頁に追加してください。

